Vol. VI MARCH, 1920 No. 3

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The International Journal of Orthodontia and Oral Surgery

A Monthly Journal Devoted to the Advancement of the Sciences of Orthodontia, Oral Surgery, and Dental and Oral Radiography

Martin Dewey, D.D.S., M.D., Chicago
Editor-in-Chief

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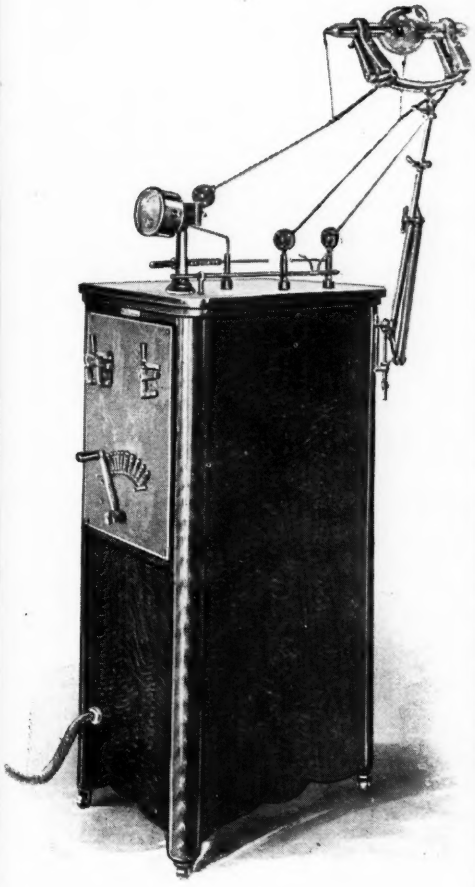

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(See page 197 for further information)

CONTENTS FOR MARCH

Original Articles

Dento-occlusal Classification of Malocclusion. By *Calvin S. Case, M.D., D.D.S.,* Chicago, Ill..... 135

Treatment of Impactions and Infraocclusion and Cases. By *Elizabeth E. Richardson, D.D.S.,* San Francisco, Cal..... 141

A Model Trimmer. By *B. Holly Broadbent, D.D.S.,* Cleveland, Ohio..... 151

History of Orthodontia. By *Bernhard Wolf Weinberger, D.D.S.,* New York City 154

Variations in Position of the Teeth in New World Monkeys. By *J. F. Colyer, F.R.C.S., L.D.S.*..... 168

Department of Oral Surgery and Surgical Orthodontia

Mouth Infection as a Source of Systemic Disease. By *M. N. Federspiel, D.D.S., M.D., F.A.C.S.,* Milwaukee, Wis..... 180

Abstract of Current Literature

Orthodontia, Oral Surgery, and Radiography..... 187

Editorials

Some Unfairness in Classifying Dental Schools..... 197

The Normal and Pathological Histology of the Mouth..... 199

A Practical Treatise of Fractures and Dislocations of the Jaws..... 200

Everyday Mouth Hygiene..... 201

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VOL. VI ST. LOUIS, MARCH, 1920 NO. 3

ORIGINAL ARTICLES

DENTAL-OCCLUSAL CLASSIFICATION OF MALOCCLUSION

BY CALVIN S. CASE, M.D., D.D.S., CHICAGO, ILL.

THE principal object of a classification in any of the sciences is to enable one to obtain quickly a general mental grasp of the thing referred to, and to recognize it or to define it as distinguished from other things of a similar nature, thus producing a clear mental flashlight-word picture of the thing itself. This is accomplished through a systematic arrangement of the objects or material into distinct groups, classes, divisions, types, etc., each one of which is characterized by some stable peculiarity in form, structure, or property of *recurring constancy, not found elsewhere in the classification.* Therefore, in naming a class in any classification, with the division of that class, and the type of the division of the class, we have presented a mental picture of the thing and its peculiar distinguishing characteristics.

In an attempt to follow this commonly accepted system of nomenclature with a view to intelligently classify malocclusions of the teeth, we are confronted with somewhat the same difficulties that confronts the science of medicine in classifying diseases.

In orthodontia, the present most popular accepted basis for the classification of malocclusions is the disto-mesial occlusal relations of the buccal teeth. This naturally divides malocclusions into three classes as follows: In Class I, the disto-mesial occlusal relations of the buccal teeth are normal or nearly so. In Class II, the disto-mesial occlusal relations of the lower buccal teeth are about the width of a cusp distal to normal; and in Class III, the disto-mesial occlusal relations of the lower buccal teeth are about the width of a cusp mesial to normal.

The consistent reason for this natural division into the three classes is as follows: In a normal occlusion of the teeth, the cusps of the buccal teeth of one denture fit evenly and anatomically into the sulci of the other. During the eruptive stage, if from some cause they do not quite take this exact anatomic relation, the forces of mastication soon drive them fully into it along the in-

clined planes of the sliding facets; except in those cases where certain causes, local or inherent, have forced the teeth to erupt so that the crests of the cusps of one denture are more or less outside the grasp of their normal spheres of influence. In this instance they at once commence to drift along the inclined planes toward the wrong, or abnormal sulci, until they have fitted themselves as closely as possible into their interlocking grasps, with the result that the buccal teeth of one denture in relation to the other, on the right or the left, or both sides, are commonly found to occlude in normal, or about the width of a cusp mesial or distal to normal occlusion.

As the teeth erupt and come into contact with their masticating fellows, they are often forced to move disto-mesially and bucco-lingually, from their erupted positions through the fitting processes of their cusps, in exactly the same way that they are moved by orthodontic forces. There is no doubt that whole dentures are frequently caused to move antero-posteriorly to a considerable extent by the mesial or distal movement of their masticating teeth in Nature's processes of fitting the cusps into their normal or abnormal interdigitating sulci, which constitutes the basis of our present three classes of malocclusion.

While this **dento-occlusal classification** here presented is quite different from the Angle classification, it will be found by teachers and students, of the greatest practical value, enabling a systematic presentation of the most advanced principles of dento-facial orthopedia, at present unequaled by any other classification. For the very great advantage of perfect harmony and unanimity in our literature and teaching, I would have gladly adopted the Angle classification were it not for the fact that as it now stands it can not be made to express a large number of very important characters of malocclusion which should be fully recognized and systematically scheduled as independent Divisions, or Types of Divisions of one or the other of the three Classes. Furthermore, the Angle classification does not recognize those *wide differences* in the character of certain malocclusions which have the *same disto-mesial occlusion* of the buccal teeth. It will be found by a careful study of malocclusions that these differences in dento-facial characters and demands of treatment *within each class* are fully as great and quite as important in orthodontia as the differences which arise between the characters of one class and another.

Note the wide distinctively different characters within each one of the three classes shown by the chart on page 139, and then let me ask: that if we take the disto-mesial occlusal relations of the buccal teeth as the distinguishing standard or basis of our classification, must we not necessarily place in each one of the classes—in the divisions or types—*all the distinctive recurring characters whose buccal occlusion corresponds to the basic occlusion of the class?*

When we name a class to which a certain malocclusion belongs, we convey a mental picture of *only* the disto-mesial occlusal relations of its buccal teeth and nothing more, except the fancied conception of its real character and dento-facial relations. And when we go further, and name the Division of its Class, we still have placed it only as one of a family of malocclusions whose individual members may differ quite decidedly from each other, though all are alike in one distinguishing characteristic. Neither can we place in the mind's eye the individually completed character of the case in hand until we have named its

Type, its Division, and its Class. There are, however, certain Divisions whose different types are so similar they require no mention in a classified chart, though in practical treatment they may differ considerably, all of which with a variety of variations should be fully outlined in the textbook teaching. In this classification, the family or divisional characteristic is based upon dento-facial relations, except in Division 1 of Class I, which it has seemed best, for teaching purposes, to distinguish as having arisen from a local cause, though differing quite decidedly in their dento-facial relations.

As a large majority of orthodontists have already become accustomed to divide malocclusions according to the three distinct occlusions of the buccal teeth—normal, mesial, and distal—the placing of all the commonly recurring dento-facial types which have a similar occlusion, in one class, will doubtless give a greater opportunity to define their wide differences in character and demands of treatment, and thus prevent as far as possible the too common error of treating cases alike on the basis of their occlusal similarity. It is hoped also, that it will tend toward preventing the insistence of placing certain dentures in a normal occlusion whose deforming facial protrusions demand extraction. And on the other hand, it is most earnestly hoped that it will prevent the extraction of teeth by those who unfortunately have made a wrong interpretation of my teaching. It certainly should appeal to those orthodontists who favor the occlusal classification, and whose highest aim in practice is a truthful and scientific diagnosis of their cases.

To those who believe that no teeth should ever be extracted for the dento-facial correction of the decided unimaxillary and bimaxillary protrusions, Dr. Angle's classification will be found quite consistent with that system of practice.

It was because of the marked differences in the character, facial outlines, and required treatment of malocclusions in Class II—in which the upper denture is about the width of a cusp in front of a normal occlusion—that led me to divide this class in a former classification, into Classes II and III, as I believed this would more strongly emphasize the importance of a differential diagnosis of dento-facial characters having the same occlusion of the teeth, certain types of which demand the extraction of teeth in their proper correction, while with others, such a procedure would be decided malpractice. In other words, it was my desire to free it from the mechanical and mathematical trend toward which the science seemed to be drifting, and to induce a deeper consideration and study of facial art and beauty as important factors of diagnosis and treatment. With the present advancement in the practical principles of orthodontia, it is hoped that a systematized arrangement of all the distinctive types of malocclusion under three heads, upon the basis of their occlusal peculiarity, will enable a full appreciation of the wide differences in dento-facial outlines with patients having, practically, the same occlusal relations of the teeth.

By carefully scanning my present classification, it will be seen that while the distinct characters of malocclusion are now divided among the three classes upon the basis of their disto-mesial occlusion, their true basis of diagnosis and treatment is dependent very largely upon the facial outlines in relation to the standard of esthetic perfection for the individual, because it is not otherwise

possible as a guide to treatment to determine whether the dentures—one or both —are really protruded or retruded.

While the dento-occlusal classification possesses the advantage of enabling us to divide and segregate a great variety of malocclusions into a smaller number of classes, it will be found as one becomes more and more advanced in the science of orthodontia, that there will arise a fuller appreciation of the fact that the disto-mesial occlusion of the buccal teeth is a very uncertain and often misleading guide as a basis of diagnosis in determining real conditions and the kind of treatment demanded, because in every one of the three classes—if all their distinct characters of malocclusion are tabulated—there will be found remarkably diverse characters of dento-facial deformities and malpositions.

One of the most dangerous features of the Angle classification, as formerly set forth, and one which, strange to say, has tended to popularize it in the minds of orthodontists, is the universally applied teaching that when dentures are placed in normal occlusion, the facial outlines will take care of themselves; and therefore, the highest possible orthodontic attainment for that individual is accomplished. If this were as true as it is believed by many, it would simplify the whole practice of orthodontia, because in theory it eradicates the necessity of a deep comprehension of dento-facial art, and many other important principles which are so difficult for orthodontists to understand.

A careful study of the great question of extraction which is so largely dependent upon Causes, and which lies at the very foundation of advanced dento-facial orthopedia, must convince every receptive truth-seeking mind, striving for the highest attainments of his art, of the delusiveness of a teaching which asserts the *universal applicability* of the "normal occlusion theory," which means that every tooth or its artificial substitute is necessary for the perfect correction of dental or dento-facial malocclusions.

In adopting the occlusal classification, therefore, it should be remembered that the disto-mesial character of a buccal malocclusion is no more or less than one of the incidents of the case in hand, requiring correction if demanded, along with other malpositions which may be present, and which are equally important to correct. It is one, moreover, that demands to the fullest extent that the masticating cusps shall be in perfect interdigitating occlusion; and furthermore—it goes without saying—they should always be placed in normal occlusion, except in those comparatively few instances where this rule is inconsistent with imperative facial demands.

There are, however, certain special and quite common malpositions which are found in every one of the three classes, because they arise from local causes, which may attack any inherited disto-mesial occlusion of the teeth, and therefore, they can not be classified as special divisions or types of any one particular class, notwithstanding the fact that they frequently dominate and characterize the whole malocclusion of the case in hand. This refers to Maleruption of Cuspids, Thumb-sucking Protrusions, Lateral Malocclusion, Open-Bite Malocclusion, Infra- and Supra-Occlusions, Malalignments, Malturned Teeth, Contracted and Expanded Arches, Abnormal Interproximate Spaces, and Impacted Teeth. It is quite as important that the principles and treatment of these malocclusions be taught, as those of the distinctly classifiable characters.

Inasmuch as the first four of this group produce at times quite marked facial imperfections, and as all locally caused malocclusions arise most frequently in connection with normal occlusions, these special characters of malocclusion are placed in the Practical Treatment of Class I, Division 1. The "Practical Technic Treatment" of the rest of this group of irregularities is fully outlined separately, with the view of showing the different methods which I employ for their correction in connection with the classified malocclusion in which they arise.

CLASSIFIED TABLE OF DENTO-FACIAL MALOCCLUSION

CLASS I. NORMAL DISTO-MESIAL OCCLUSION OF THE BUCCAL TEETH.

Division 1: Locally Caused Dento-Facial Malocclusions.

TYPE A: UNILATERAL MALERUPTION OF CUSPIDS.
TYPE B: BILATERAL MALERUPTION OF CUSPIDS.
TYPE C: BILATERAL MALERUPTION OF CUSPIDS REQUIRING EXTRACTION. (FROM CLASS II.)
TYPE D: PROTRUSION OF UPPER FRONT TEETH.
TYPE E: RETRUSION OF UPPER FRONT TEETH. (TREATED IN DIVISION 2, CLASS III.)
TYPE F: LATERAL MALOCCLUSION.
TYPE G: OPEN-BITE MALOCCLUSION.

Division 2: Bimaxillary Protrusion and Retrusion.

CLASS II. DISTAL MALOCCLUSION OF LOWER BUCCAL TEETH.

Division 1: Retrusion of Lower Denture.

TYPE A: PRONOUNCED RETRUSION OF LOWER DENTURE, WITH UPPER NORMAL.
TYPE B: MODERATE RETRUSION OF THE LOWER DENTURE, WITH MODERATE PROTRUSION OF THE UPPER DENTURE.

Division 2: Protrusion of the Upper, with Lower Normal.

TYPE A: UPPER CORONAL PROTRUSION.
TYPE B: UPPER BODILY PROTRUSION.
TYPE C: UPPER CORONAL PROTRUSION WITH APICAL RETRUSION.
TYPE D: UPPER APICAL PROTRUSION WITH LINGUAL INCLINATION.

Concomitant Characters of Class II.

RETRUSION OF THE MANDIBLE AND LOWER DENTURE.
CLOSE-BITE MALOCCLUSIONS.
MALERUPTION OF CUSPIDS. (TREATED IN CLASS I.)

CLASS III. MESIAL MALOCCLUSION OF LOWER BUCCAL TEETH.

Division 1: Bodily Retrusion of the Upper Denture and Maxilla.
(With lower normal, though apparently protruded)

Division 2: Contracted Retrusion of the Upper Denture.
(Due to inhibited development of maxillæ)

Division 3: Retrusion of the Upper with Protrusion of Lower Denture.
(With no protrusive position of the mandible)

Division 4: Retrusion of the Upper with Prognathic Mandible.
(Commonly accompanied with Open-Bite Malocclusion)

In regard to the Classified Table of Dento-Facial Malocclusions here presented, it should be understood that only the distinguishing types of the different Divisions of the Classes are stated in the accompanying table.

It was my hope to present this subject, illustrated with lantern slides before the American Society of Orthodontists, where it would be subjected to a free discussion of the propositions; though I may be pardoned for believing that a competent discussion of so much importance as one which proposes a radical change in an accepted classification of malocclusions should not be engaged in without a deep unbiased study of the changing demands in our advancement, and the broad principles involved in this new classification.

For my benefit and instruction as a teacher, and for the benefit of many others who are more or less guided by my teaching, I should like to have published in subsequent numbers of this or other dental journals, a free friendly discussion of the merits and demerits of this classification from the pens of distinguished orthodontists, with specific statements in regard to its faults and reasons why it should not be adopted as an improvement, at least, over the present dento-occlusal classification.

This would give me an opportunity to more clearly define certain parts which may not be fully explained or understood, and to accept with thanks irrefragable suggestions for its improvement in character or phraseology, with the hope that we may finally arrive at a classification that can be acceptably adopted as the standard nomenclature of malocclusions and of teaching and practice. There is nothing in my opinion that could advance orthodontia so much, or do more to carry it out of the quagmires of prejudice, distrust and uncertainty, and place it on a sure foundation as a science.

TREATMENT OF IMPACTIONS AND INFRAOCCLUSION AND CASES*

By Elizabeth E. Richardson, D.D.S., San Francisco, Cal.

IT gives me great pleasure to be present once more at a meeting of this society, and to have the privilege of submitting for discussion the results of my treatment of impactions and infraocclusion cases.

We are all striving for the highest ideals and there is nothing that will incite one to greater effort in the work than to be present at these meetings, that we may enjoy the many opportunities this society affords.

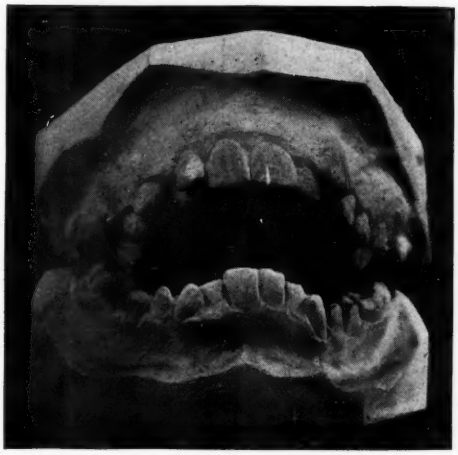

Fig. 1.

Fig. 2.

Orthodontics, as a specialty of dentistry and medicine, has become recognized by many as one of the most important branches of these professions. Let us make an effort to be present at these meetings and to contribute whatever we may to the progress of this science.

The treatment of infraocclusion, or open bite cases, has been a subject of much interest to me, and there are many things to be considered in the treatment of these cases.

*Read before the Alumni Society of the Dewey School of Orthodontia, St. Louis, Mo., March 6, 7 and 8, 1919.

The etiology of many of the infraocclusion cases is rickets, while some are due to habits.

In rickets there may be a thickening of the alveolar process, narrow upper arch, overdeveloped mandible, and the teeth are sometimes tipped lingually. As there is faulty bone formation, slow and careful treatment is then indicated.

TREATMENT

A simple course of treatment may be used by placing molar bands with buccal tubes on the first permanent maxillary molars, and lingual wires extending from the molar bands to the first premolars, as showing in Fig. 6. An expansion arch is then adjusted to rest upon the anterior teeth, *placing the nuts*

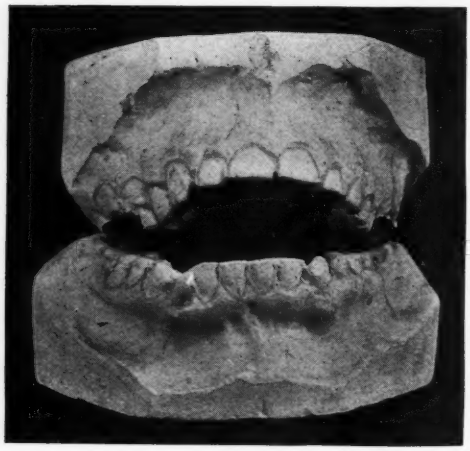

Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

mesial to the tubes. Wire through the interproximal spaces between the first and second premolars, engaging the lingual wire and the expansion arch which causes force to be exerted upon the anterior teeth under the stress of mastication. Expanding the arch relieves the close contact of the anterior teeth, and the force exerted upon them by the expansion arch causes the teeth to erupt. I place thin bands on the anterior teeth to protect them from abrasion of the expansion arch. For treatment of the inferior arch, I use lingual or labial arches with finger ex-

tension springs where indicated. The result of this treatment is most gratifying, with little or no soreness. I remove the appliances for a period of rest several times during the course of treatment, allowing Nature to do her part in the development.

To obtain permanent results in these cases, the treatment should progress slowly. Fig. 1 shows the case before treatment. Fig. 2 shows the progress of the case. The appliances have been removed for a rest period of four months.

Figs. 3, 4 and 5 show a case of infraocclusion due to a tongue habit, and is now under treatment in the same manner as I have described, but in a much shorter period of time and with the cooperation of the patient, which is of much importance in correcting the tongue habit, the prognosis is favorable.

Fig. 7.

Fig. 8.

Fig. 9.

Fig. 5 shows progress of case. The treatment outlined in this case is to lengthen the incisors, canines, and premolars in the maxillary arch; if the upper lip is short, I lengthen the teeth in the inferior arch to more evenly divide the development. Expand the maxillary arch and carry out whatever treatment that may be indicated in the mandibular arch. The lip can be lengthened by daily exercise drawing it downward.

IMPACTIONS

Fig. 7 shows a case of impactions of the six anterior teeth. The patient, ten years of age, was suffering from extreme nervousness and mental depression.

Molar bands were placed on the superior first molars, with a lingual arch

resting against the premolars and deciduous canines, and by the use of the wire stretchers, which cause a gentle stimulus to the arch, sufficient space was made for the impacted teeth to erupt.

Fig. 8 shows progress of the case after six months' treatment. The condition of the patient both mentally and physically is normal.

Fig. 9 shows a case of impacted central incisor and canine of the maxillary arch.

By the use of the x-ray, the impacted teeth were located, showing the canine locked under the central incisor. An opening was made directly over the central incisor, exposing the entire lingual surface of the tooth. A small cavity was then prepared in the tooth lingually, and a 22 gauge iridioplatinum pin cemented in

Fig. 10.

Fig. 11.

Fig. 12.

Fig. 13.

Fig. 14.

the cavity, forming a hook of the exposed end. Molar bands were placed on the maxillary first molars with a lingual arch, and an extension spring wire of 22 gauge soldered to the lingual arch at one end, forming a loop of the detached end, and by springing the extension wire occlusally and labially, and ligating it to the pin that is cemented in the impacted tooth, the central is being forced into position, liberating the canine, which is also erupting. Fig. 9 also shows appliances in position.

Figs. 10 and 11 show impacted superior canines being treated in the same manner.

Fig. 12 shows case of an impacted canine forcing the lateral out of position. The lateral being very loose and in supraocclusion, and the root absorbed, a wire

ligature was placed on the anterior teeth, forming a support to the lateral, as shown in Fig. 13. The same treatment was applied as in Fig. 9. After the canine was carried into position and the pressure relieved on the lateral, the splint was removed and the tooth resumed its normal position and tightened. The patient is between six and seven years of age only. This case will be kept under close observation with the use of the x-ray.

Fig. 14 shows canine and lateral in position.

Fig. 15.

Fig. 16.

Fig. 17.

Fig. 18.

Fig. 19.

Fig. 20.

Figs. 15 and 16 show a case of two supernumerary teeth, and an impacted central incisor. The supernumerary teeth were removed, and a lingual arch placed in position, attached to molar bands. A lug was soldered to the lingual arch resting against the central, keeping the median line established, until the impacted central erupted, which was carried into position by ligating it to the lingual arch.

Fig. 17 shows the same case before treatment.

Fig. 18 shows impacted central erupting.

Fig. 19 shows completed case with sufficient space for the erupting canine.

Fig. 20 shows a case of an impacted mandibular second premolar.

Place molar bands and a lingual arch in position with a lug soldered to the arch opposite the canine. A band with a tube or hook attached was placed on the first premolar, which was ligated to the arch for the purpose of moving the premolar mesially, thereby gaining space for the impacted premolar. The anterior teeth were ligated to the arch, and the wire stretcher used in the premolar region to gain space also.

Fig. 21 shows the progress of the case with the second premolar erupting.

Fig. 22 shows an impacted second deciduous inferior molar. Patient, seven years of age, had suffered for some time with earache. The arch was undeveloped. The first permanent molar could not erupt and only the point of the mesiobuccal cusp of the deciduous molar was exposed. The premolar is deflected distally.

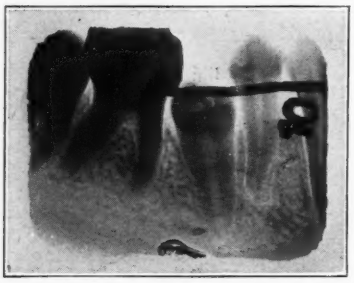

Fig. 21.

Fig. 22.

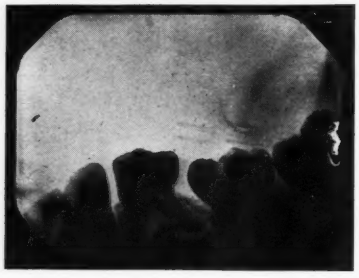

Fig. 23.

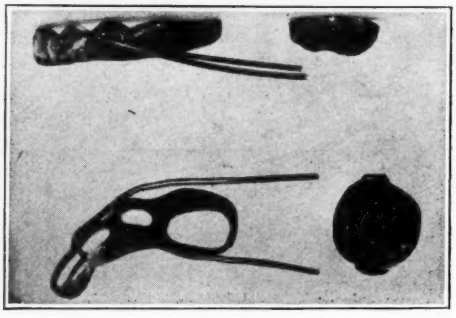

Fig. 24.

The gum was removed from the crown of the deciduous molar and allowed to heal. A crown was made to fit the corresponding second deciduous molar which was fully erupted. Lingual and buccal half-round tubes were soldered to the crown, which was cemented to the impacted molar. A cast splint of coin silver was made to fit the incisors, canine and first molar, with wires of 22-gauge iridioplatinum soldered to the lingual and labial surfaces. The splint was placed in position. The wires were bent occlusally and placed in the half-round tubes of the crown on the impacted deciduous molar, which elevated or caused the tooth to erupt, and the arch developed interstitially.

Fig. 23 shows development of the arch, and the first permanent molar in position and the premolar erupting normally.

Fig. 24 shows the appliance.

DISCUSSION

Dr. Wm. A. McCarter, Topeka, Kansas.—Dr. Richardson has given us some practical ideas of some of the conditions that we have to deal with in our practice. I have had a few cases which almost parallel those she has reported and has shown slides of, and I have had the usual trouble, I suppose, in getting the teeth to their proper position. At least, I suppose it is trouble; it is with me, and if the rest of you can get along so well with these cases I would like to know how it is done. This is particularly true with reference to the short incisors that have caused a great deal of trouble. I have undertaken to pull them down, and as they are almost always accompanied by a short upper lip it is very distressing if you undertake to lengthen them too much.

I am treating a case now similar to the one Dr. Richardson spoke of toward the

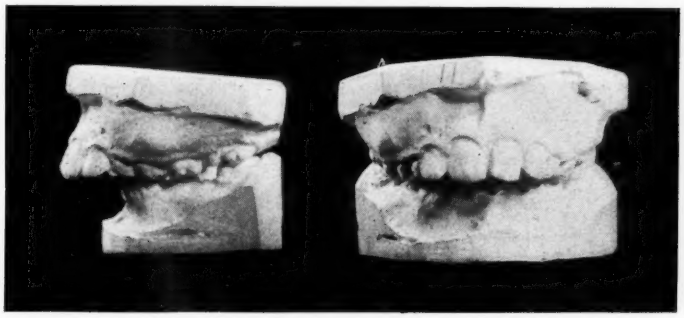

Fig. A.

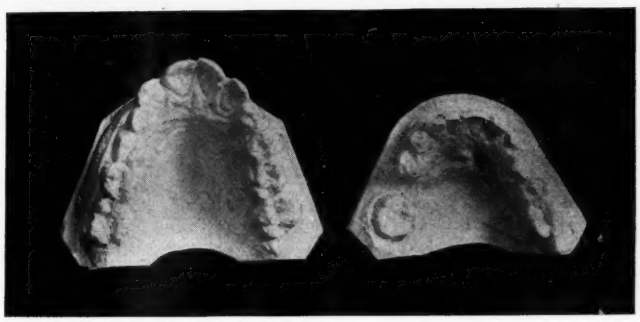

Fig. B.

latter part of her paper. I shall describe the case I have under treatment. When it was time for the eruption of the second temporary molar it seemed not to erupt at all; it came to the surface, showing the occlusal surface, and it seemed not to grow any more and there was quite a space. There was no occlusion at all in the temporary teeth. When the first molar came in it tipped forward quite a distance, and the x-ray showed the tooth perfectly formed, and not only that, but the premolar was well formed. I put on a band and spring appliance to tip the first molar back, and I am getting results. Another case I wish to speak of in connection with infraocclusion was complicated with a rather undeveloped condition of the mandible, where the incisors were so long that they reached up into the roof of the mouth and were touching the gum quite a distance back of the upper incisors. This caused a great deal of trouble.

I think I have a lantern slide of that case that I shall show. (Fig. A.) This case, you see, has a very much undeveloped mandible with impaction of the premolars. The lower central incisors were reaching up into the roof of the mouth and making indentations in the palate. In bringing them forward to develop the mandible I found a considerable shortage of premolars; when they came in they had to be elongated.

Fig. B shows a difference in the size. It shows the relative size of the upper and lower arches.

Fig. C shows the result I finally got.

In doing this thing and using ordinary expansion of the arch, I put considerable stress on the premolars and raised them after they ceased to erupt of their own accord, and this illustration (Fig. C). shows the occlusion obtained. That is the result of the case after it was completed. As you can imagine from the looks of the first picture, there was a short mandible, and a very much undeveloped condition.

Speaking of impactions, I had one case of impaction that came under my treatment (Fig. D). In this case the treatment was begun by Dr. A. C. Smith, of Pasadena, California, who just got the case started, and the patient moved to our town and fell into my hands. I treated the case with the result shown in Fig. E. That is the little experience I have had with infraocclusion, and my treatment has been in accordance with the best method known to me of handling the case.

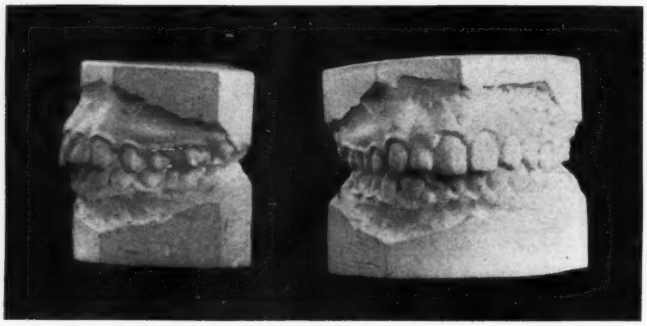

Fig. C.

Fig. D.

Fig. E.

I should like to hear some one discuss this subject who has a more scientific way of handling these cases than I have.

Dr. H. A. Pullen, Buffalo, New York.—I have not very much to say on this paper, although I enjoyed it very much.

I have had quite a number of cases of impaction from time to time, and have a case on hand at the present time. The last one I had came from out of town. The patient was a young lady who was very much frightened for fear she had to undergo a serious operation, that is, cutting through the palatal surface of the dental arch to get at a canine tooth which was impacted. The operation was simple and did not require a general anesthetic. I believe she was given a general anesthetic when it was first attempted in another city. She complained about it, and when she fell into my hands I could hardly get her to open her mouth to get at the gum tissue and get under to the tooth substance to put a pin in the tooth.

Most of the difficult cases we have to deal with are found in the palatal surfaces of the dental arch—canines. The use of the lingual arch is a new phase of the operation. In

many of the cases the appliance does not show, and many of these cases are in patients of an age where the individual dislikes very much to have an appliance that is conspicuous. For instance, in the case of impacted canines there will be a good many years before the tooth is drawn out. I have used both lingual and labial arches for the basal attachment or apparatus to draw down the tooth in that position, and in addition using a lingual spring attached lingually or labially, or I attach a silk ligature, and later on use an elastic rubber ligature.

The operation of cutting down on the tooth is a very simple one, and those who have not tried it need not be afraid of it, unless they find from their radiographic diagnosis that the tooth is deeply impacted and may necessitate the aid of an oral surgeon to assist in getting down on the surface of the tooth itself. If, as is usually the case, the tooth is a slight distance below the gum, with a slight covering of bone, it only necessitates a local anesthetic, in order to make the tissues sufficiently anesthetized so as not to give pain in cutting down to the tooth. There is no pain over the canine, and one can put in a tampon of cotton, leave it overnight, and see the patient the next day, and then carefully locate the point at which you want the arch, or the tooth you want to locate with a plan for attachment from that tooth to the basal anchorage. It is unnecessary to cement the pin in position. The hole, as drilled in the portion of the tooth, is away from the dental pulp, it can be turned inward, having made the pin in a hook form, it will be in there so tight that it will stay during the entire operation without cementation. Cementation is really the most difficult part of the whole operation.

Dr. H. C. Pollock, St. Louis, Mo.—A point in regard to impacted teeth, particularly canine impactions. We find in many instances, canine teeth to be impacted and in contradiction to the remarks made by Dr. Pullen, these teeth do not appear most commonly above the surface of the compact bone, but are encased in a cyst-like shell of compact bone, not unlike a pea is held in a pod; and when this shell is penetrated with a bur or sharp instrument, the bone dissects off easily and breaks away, making the impacted member easily accessible for any operation it is seen fit to do on it.

Another point in this discussion; that is, the use of the Steeles replaceable facing kit which may be sometimes utilized to very good advantage in the handling of these impactions. As you know, this kit is equipped with a chisel bur which may be employed to drill the hole through the enamel of the tooth. There is also a threaded male die of the exact size of the chisel bur which may then be utilized to thread the hole through the enamel and on into the dentine. After this is completed, the small gold screws which come with the outfit then exactly fit and may be screwed into this hole with the small miniature screw driver which is a part of this kit. After finding that the screw will twist into the hole made in the impacted member, any attachment desired may be soldered onto the head of the screw, then cemented into place.

Dr. George F. Burke, Detroit, Mich.—I would like to ask Dr. Pullen what sort of wire he uses to insert in these impacted cuspids, whether he makes it himself, or is it something that can be purchased from the supply houses?

Dr. H. A. Pullen.—I usually make the wire myself, a little larger than the diameter of the hole drilled in the tooth, then thread it and make it taut. Be sure it fits tightly in the hole, and turn it in so that it will not come out. The use of wire of small diameter is not conspicuous and does not interfere with occlusion or anything like that. One must be sure that the wire or thread does not slip when it is in position.

Dr. E. G. Weeks, Saginaw, Mich.—I can show you a number of x-ray pictures where there is a sac, you might say, around the bony portion of the canine which is very hard just before you break into the conical portion of the canine. I have seen these sacs extending across a portion of the canine where the tooth was retained for a long time. In one patient I have in mind, thirty-eight years of age, the sac extended over half the way up the length of the canine. I have cut through that and I find the bone is very compact. It is hard. It is like a shell.

I have a kit from the Blue Island Company, and have had no difficulty with it. If the thread on the pin wears off before you can get it to stick, if you take a little tap you can

thread the tooth and cut the wire with the same thread you have on your tap. I put cement on the pin. If it takes a long time to fit the tooth, it will take a corresponding length of time to get it out. You are more or less apt to have decay of a portion of the tooth occurring before you get the tooth down into place without cement even though the pin is threaded and tooth threaded. I have presented that and mentioned it in connection with the discussion of Dr. Simpson's paper. I have lantern slides to show the method of technic of making a hole in the tooth, threading the tooth, and threading of the pin, etc.

Dr. H. A. Pullen.—The last case I mentioned came from a very dear friend of mine out of town. In his third attempt at operation he could not locate the surface of the cuspid, although he had opened through the tissue. He drilled a hole into the cuspid and it took me half an hour to locate where he drilled the hole. He drilled beside the cuspid in the bone. He put a pin in there which lasted forty-eight hours. That is not an infrequent occurrence. If the tissues have not been opened wide enough, a tampon of cotton will spread them apart so that one can see what he is operating on.

In studying radiograms I locate exactly the surface on which I am operating. If you are drilling into the enamel you have to have a diamond-pointed drill, a brand new drill, or a small pointed bur until you get the initial opening through the enamel itself; then everything goes smoothly.

Dr. W. E. Lundy, Memphis, Tenn.—This subject we are discussing is of very great interest to me. I have had a little experience with some of these cases and have had some trouble with them.

I would like to ask whether any of you have had any experience with the method of Dr. Crawford, of Nashville, in regard to tapping. He simple makes an opening into the tooth and by putting an instrument against it produces irritation by tapping the instrument with his mallet. That method frequently brings about results. In one or two cases I have succeeded in getting the tooth to grow after that plan without putting anything else on it.

What experience have you had in cases of that sort?

Dr. Pullen.—How long did you wait before tapping?

Dr. Lundy.—In the cases I had, possibly six or eight months. As I recall now, I had two cases in which the teeth grew in about that time. I extracted a temporary canine that had been retained, and there was no indication of the tooth coming at that time, and when I found it in there, I started by setting up this irritation.

Dr. Burke.—What was the age of the patients?

Dr. Lundy.—Both of them were adults; I don't remember their age exactly, but there was room enough for the tooth to come in provided the temporary canine had been removed.

A MODEL TRIMMER

By B. Holly Broadbent, D.D.S., Cleveland, Ohio

THE accompanying pictures show the use of a wood trimmer for finishing plaster models. This was suggested by Mr. Charles Arnold, a student at East High School of Cleveland, who designed a machine which approached this wood trimmer very closely.

Aside from a few slight changes, the outline of the models is that worked out by Dr. Martin Dewey. Fig. I shows a lower model in position for the first cutting —trimming the base line (*B*) at right angles to the median line (*M*). The first cuts taken may be very thick if the plaster is not too dry, and as the desired line is neared, it may be reached by removing thin shavings. This avoids chipping the

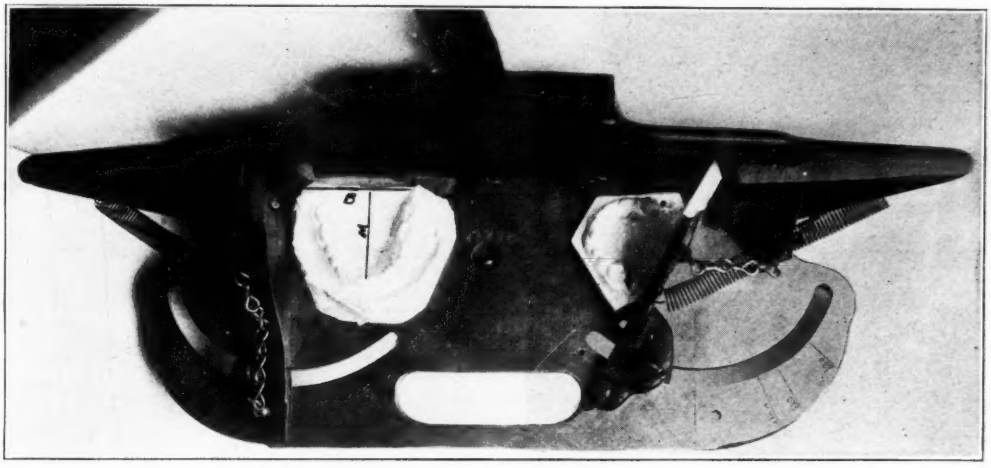

Fig. 1.

margins and makes a smooth-finished surface. The next picture (Fig. 2) shows how the gauge gates may be set and the sides of the model trimmed parallel to the buccal surfaces of the premolars and molars. Thus, the front and corners may likewise be finished. In this case, the front of this lower model was cut straight across, but if a curved front is desired, the bulk of the plaster can be removed by the machine and the curve finished by hand.

Now the upper model may be occluded with its lower and so held in the machine as to trim off the posterior surface (*UB*-Fig. 3), until it is in the same plane as that of the lower (*LB*-Fig. 3). This plane will indicate the proper occlusion of the teeth and avoid the marking of the anatomic portion of the models. With the models still occluded they may be held in the position shown in Fig. 4, keeping the bottom of the lower model (*L*) in a plane parallel to the cutting plane of the blade, so that the top of the upper model may be made parallel to the bottom of the lower. This will be made easier if the gauge gate is placed at 90° and the bed of the machine marked with a number of lines parallel to the blade (see Fig. 4). The front of the upper may now be trimmed from the median line

back to a point over each canine, the angles with the median line depending upon the shape of the arch. Trimming a small bevel around the periphery of the upper as shown in Figure 5 gives the whole a more artistic finished appearance. This may be done easily with a knife.

The machine shown has been used nearly six months by Dr. W. E. Newcomb and has needed no attention, except the removing of the plaster from the blade

Fig. 2.

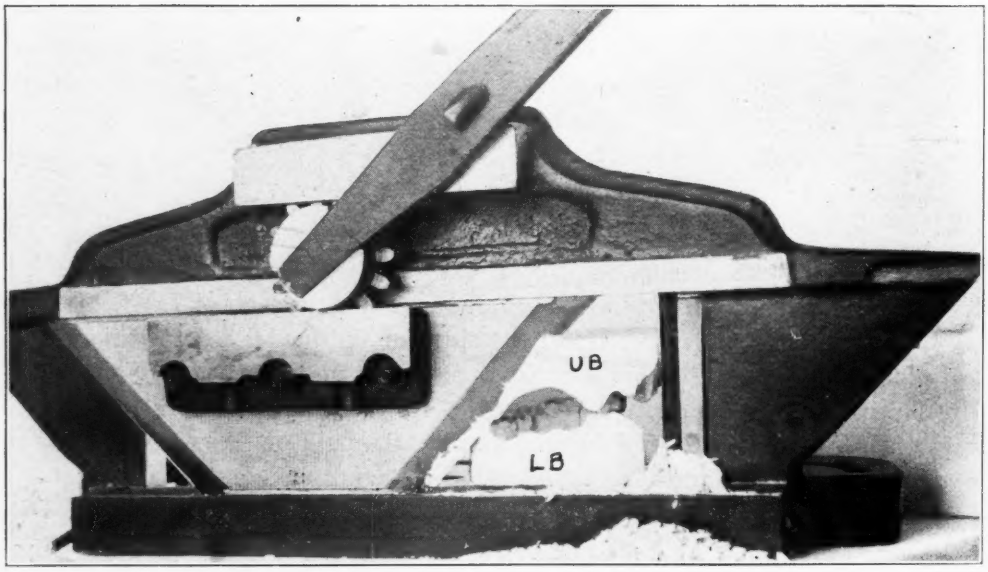

Fig. 3.

and the other unpainted surfaces after each day's use. It has been wisely suggested that all rusting might easily be prevented by nickel plating the exposed surfaces, except the cutting edge of the blade. This machine has already paid for itself many times over, in time and labor, and requires no special ability to operate. A set of models can be finished in ten minutes and most of the annoying task of handling plaster eliminated.

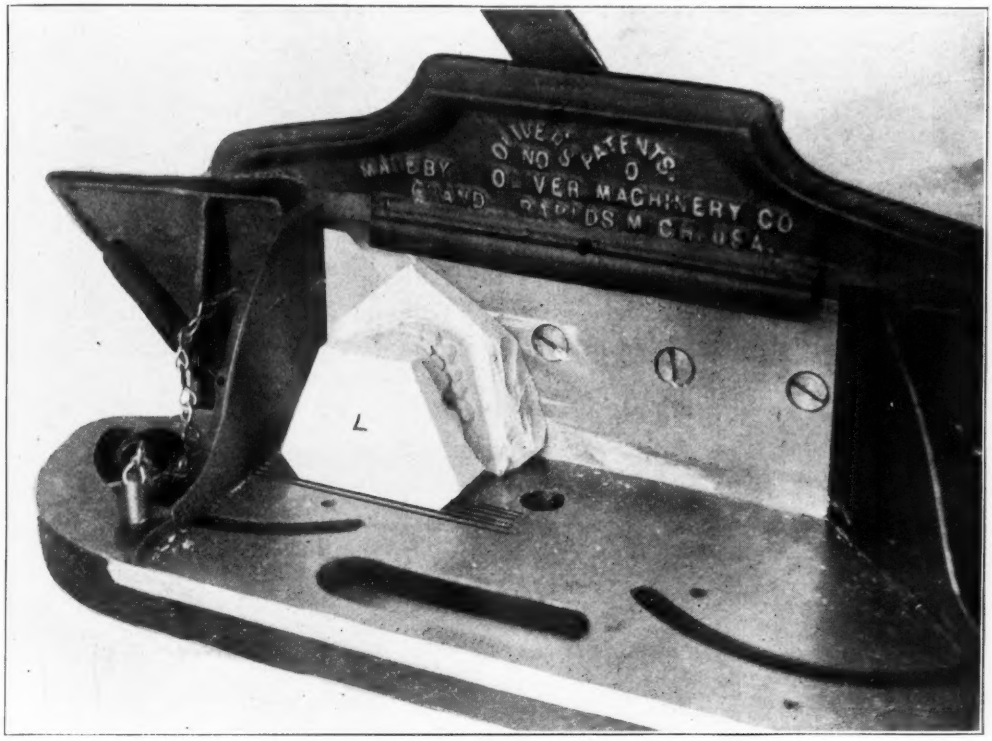
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Fig. 4.

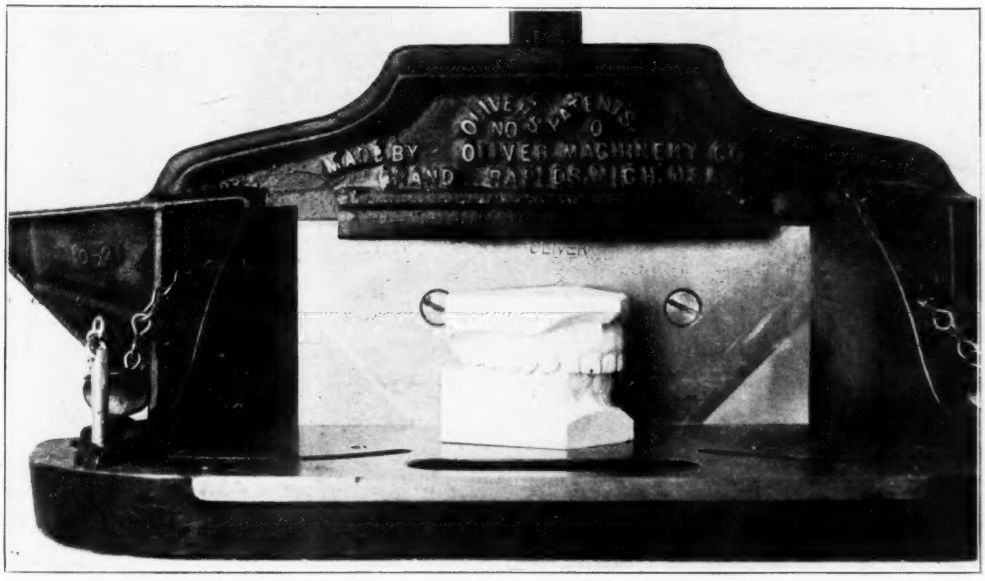
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Fig. 5.

HISTORY OF ORTHODONTIA

(*Continued from page* 92.)

By Bernhard Wolf Weinberger, D.D.S., New York City.

VICTOR HUGO JACKSON, M.A., M.D., D.D.S. In 1887 before the *New York Odontological Society,* Jackson presented a simple wire device for the regulation of teeth, which he termed a *crib.* Although he had used other apparatus prior to this time, and appliances similar in design had been used, this term is now associated with Dr. Jackson's name and that type of appliance has become known as the *Jackson crib.* (Fig. 1.)

Fig. 1.—Dr. Victor Hugo Jackson.

The "crib" is designed as an anchorage attachment for plates of various kinds, "this anchorage was gained by extending a spring wire on the lingual and labial sides of the teeth near the gums, in some cases including all of the teeth, in others only a part of the arch; the spring in the labial and lingual sides was connected by passing wires over the arch at the junction of the teeth. Later I [Jackson] devised the Jackson System. The anchorage is secured by spring-clasp attachments and partial-clasps, supporting a base-wire, to which any form of spring can be added." [Preface to *Orthodontia and Orthopaedia of the Face.* (1904.)]

(*Copyright,* 1920, *By Bernhard Wolf Weinberger*)

In appearance Jackson's crib resembles the devices of Delabarre, Schanage, Evans, Lachaise and Atkinson, although these were used principally to open the bite.

The following are the claims made of the system.

1. Ease of construction and alteration.
2. Firm anchorage.
3. Occupation of little space in the mouth.
4. Cleanliness.

Dr. Jackson was one of the early advocates of continuous pressure in preference to intermittent force as brought forth by Dr. Farrar.

Some Methods in Regulating, Dental Cosmos, page 372, 1887:

"It is my custom, before choosing the method to be pursued, to prepare models of the upper and lower teeth, that their articulation and the position of those to be moved can be more fully apprehended and the models preserved for future reference. The method that will cause the least pain and inconvenience to the patient, the least injury to the teeth and surrounding structures, interfere least with articulation and move the teeth to the position desired in the shortest time, should be adopted.

"I believe that as dentists and members of societies we should deal more with practical cases, and not speak so much as is common from a theoretical standpoint, if we wish best to assist our fellow dentists. With this feeling I have brought before you this evening several models illustrating the position of the teeth before and after regulating. The appliances used in these special cases, both for moving the teeth and to retain them in position, are also shown.

"As the models are examined, it will be seen that the arch was first spread by a plate described, and then wooden pins so inserted as to force the lateral forward toward the central. Later the pins were so changed in position as to send the tooth outward.

"The plate was inserted April 22, and taken out July 10, the teeth then being in proper position, although not fully erupted. A retaining wire, after the idea suggested, I think in this society, several years ago by Dr. Atkinson, was used very successfully, and worn until September 15, when the patient was discharged. Dr. Atkinson recommended half-round wire for retaining. I use round platinum and iridium wire, forming it upon a plaster model, by starting on the palatal surface of the molars, and following the line of the gum; bending the wire sharply, with the fingers or the clasp-benders, to such form as will best clasp the necks of the teeth. It can be extended around the entire arch to the place of beginning, or pass over at any place the articulation will permit. Short pieces of the same material can be passed between the teeth or over certain cusps to stiffen the appliance and to keep it from riding on the gum. These pieces should be soldered with pure gold. If necessary to connect between the front teeth to stiffen the remaining wire, slots should be punched in the ends of a narrow piece of thin platinum plate to receive the wire, and pure gold flowed over all. I have found this a most valuable retaining appliance, and after a little experience it can be used in a majority of cases. It can well be called a

crib, and used in a great variety of forms. It was used successfully to retain a right superior central that had been drawn back from a very prominent position where it had overlapped the left central. A crib was made to fit over and around the bicuspids on the left side, from which a wire was extended along the palatal surface of the teeth to the space between the centrals through which the flattened wire passed and hooked around the right central. It could be displaced and cleaned by the patient, and there was nothing in sight but the slight end of the hook. It takes but a few minutes to construct such an appliance. The same method can be used for the attachment of cords or rubber rings, where traction is needed toward the distal part of the mouth, the crib being made to extend over two or more teeth as the case requires, and a hook formed at one side at any angle desired to make proper tension."

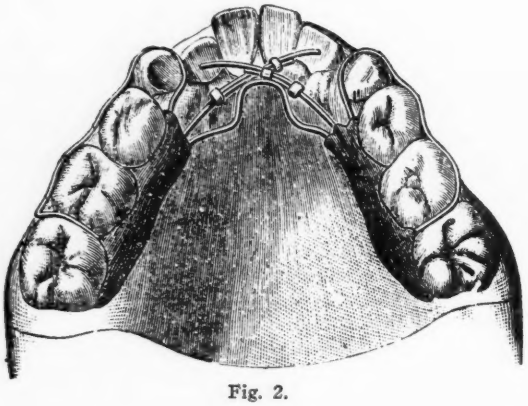
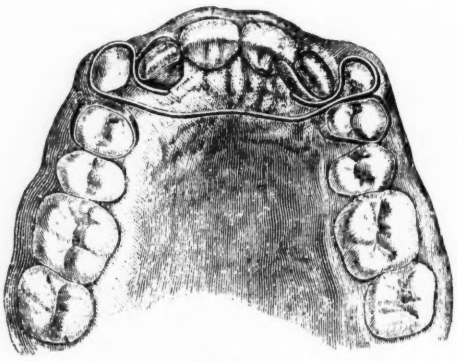


Fig. 2.



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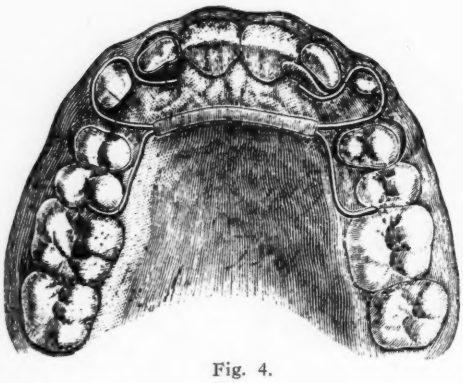

Fig. 4.

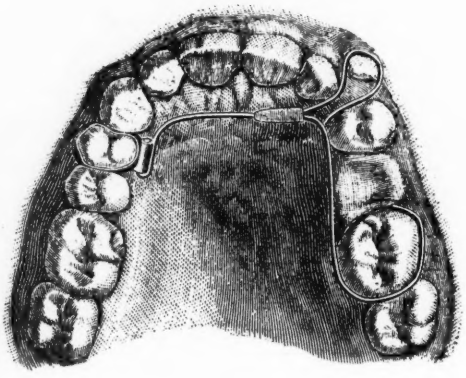

Fig. 5.

One of the appliances described by Jackson is shown in Fig. 2, and is the retaining wire as applied and worn for several months.

Before the *American Dental Association,* 1889, under *Some Methods of Regulating Teeth,* Jackson goes into greater detail concerning his system. Figs. 3, 4, 5, and 6 illustrate the method he then used.

Correcting Irregularities of the Teeth is the title of a paper given by Jackson before the *International Medical Congress* at Berlin, 1890.

(*Dental Cosmos,* 1890, page 877.) "Orthodontia will no doubt eventually become a distinct specialty of dentistry, but it is necessary at present for the general practitioner to be more or less familiar with the systems in use, in order

that he may choose that which will be the most effective in a given case and require the least outlay in construction. It is my purpose in this brief paper to describe and demonstrate with models and apparatus some methods of applying removable springs without the use of a plate for regulating teeth, describing methods that I am using daily, and with which I have attained good results in a limited time, and in passing I desire to express a growing confidence in the use of the removable spring in moving teeth. Piano wire is at present the best spring for the purpose, although spring gold, silver, and German silver are often applicable, especially if the temper is not drawn while soldering, and that can be avoided in some cases by keeping the spring portion cool or by using soft solder, which is usually preferable."

The crib as described in this paper was made "for each side of the arch, to encircle all of the teeth back of the incisors; a slight separation was made by wedging in front of the cuspids, and a round iridio-platinum wire was flattened to pass into the space on either side, and extended back following the line of the gum and surrounding the cuspid, bicuspids, and molars. This was supported and made to more firmly clasp the teeth by making cross-bars to connect the two

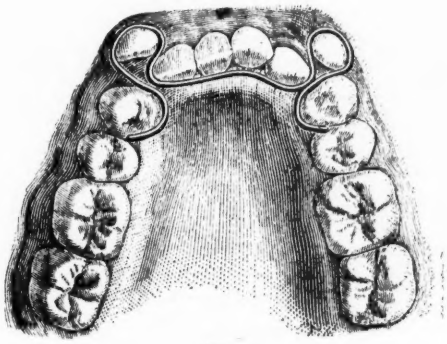

Fig. 6.

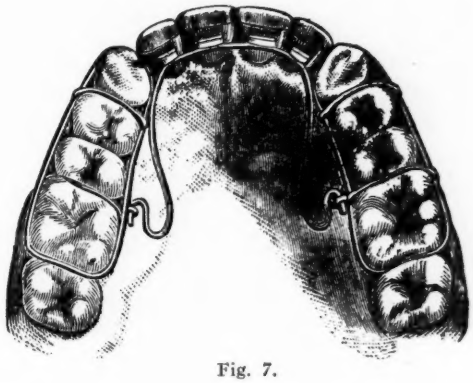

Fig. 7.

sides of the crib by passing over the articulating surface at the junction of the teeth, serving also to keep the crib from pressing on the gum.

"There was a loop soldered to the crib-wire opposite the palatal surface of the first molar on each side of the arch, into which loop was hooked the end of a piano wire formed like the letter *S* and extended forward, passing just back of and following the curve of the incisors. There were placed on the incisors gold collars with lugs soldered on their palatal surfaces, to hold that portion of the spring in position. Fig. 7 shows the device in place on the four incisors in another completed case of the same character.

"Pressure was made as needed, by straightening the S loops of the spring wire a little at a time.

"The incisors were moved rapidly, and when sufficiently forward, the portion of the crib in front of the cuspids was removed, and a piece of piano wire was soldered to the original spring wire, which extended to the distal sides of the cuspids, by the application of which they also were moved forward. Another spring was then attached by solder to the original one, as before, to move the cuspids forward, and at the same time one of the cuspids was prepared to

be rotated by placing on it a collar, with a cylinder soldered to its palatal surface, to hold a spring which extended to the opposite side of the arch and hooked into the loop in the crib.

Figs. 8, 9, 10, 11, and 12 illustrate some of the various devices shown before that Congress. In a case of protrusion of the mandible Jackson presented the following method:

"A split plate (Fig. 13) was made as described by Dr. W. H. Coffin, of England, except that it did not cover the teeth or open the bite. It was strongly retained by two wire clasps extending from either side to clasp a bicuspid and molar. The plate was divided laterally, leaving the anterior part sufficiently

Fig. 8.

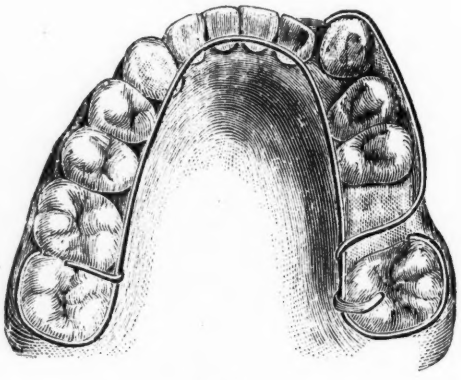

Fig. 9.

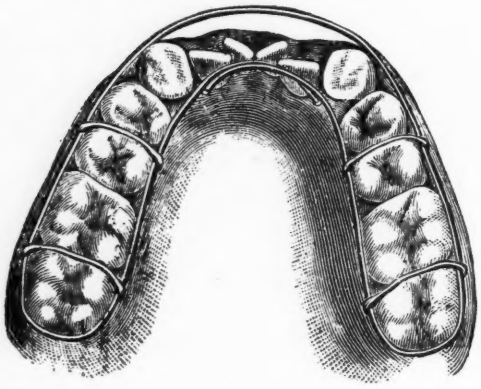

Fig. 10.

Fig. 11.

large to cover the intermaxillary portion of the process for the purpose of forcing it forward with the teeth. Collars of gold, with lugs on their lingual surfaces, were placed on the incisors, and firmly retained the anterior part of the plate.

"When the incisors were moved as far forward as practicable the appliance shown in Fig. 14 was made and adjusted, as seen in Fig. 15."

Methods of Regulating Teeth, Cosmos, 1891, page 1067:

"It is not the present intention to enter into a discussion of the reasons for advocating early regulating, as that is not the purpose of this paper, which leaves the question for consideration at another time.

"It is, however, the opinion of the writer that each tooth should be encouraged to take a correct position in the circle of the arch while erupting (or as soon thereafter as practicable), in order to promote the proper development of the jaw, for the teeth next to be erupted are thus more likely to do so in proper position and order. Only a portion of the alveolar process that forms the sockets for the roots of the teeth is developed until the teeth are fully erupted. For this reason a slight pressure will change their position.

"When convinced of the advisability of regulating teeth for young patients, several devices have been adopted with partial satisfaction, but none as yet have met all the requirements so perfectly as the 'crib,' which is equally applicable to patients of every age.

"The common and reckless extraction of temporary and permanent teeth to relieve crowding should be discouraged, and in preference, when necessary, an appliance be made for spreading either the superior or inferior arch.

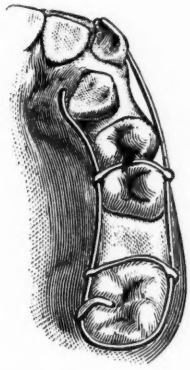

Fig. 12.

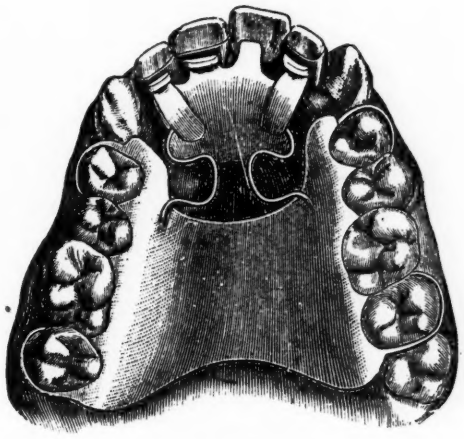

Fig. 13.

"If there is insufficient room for the free eruption of the permanent teeth, it is best to begin to expand the arch, if necessary, when the incisors are erupting, an operation easily accomplished by means of the crib appliances.

"The advantage of using the crib appliance for young patients is that it is easily retained, causes no inconvenience, and does not interfere with articulation, even when used in the upper and lower arches at the same time.

"By attaching the appliance to a single tooth on each side of the arch as an anchor, all of the other teeth tend to support it, and thus, in ordinary cases, the same object is gained as when more teeth are used as anchorages.

"If the arch is much crowded and some of the teeth too prominent or requiring to be rotated while at the same time expanding the arch, an appliance like Fig. 16 will often be required, and in addition to the appliance described a base wire should be anchored either to the second temporary molar, second bicuspid, or first permanent molar on each side of the arch, and provided with one or two loops or corrugations, just anterior to the crib attachments. The loop-shaped spring is then united to the base wire by one of the methods previously described. To expand the arch, the loops or corrugations in the base wire

are opened slightly from time to time, and the loop in the spring over the incisors changed to meet the indications.

"If the lower incisors are crowded, and especially if they are held back by the position of the superior incisors, and their position is such as to require the whole or part of the arch to be expanded, an appliance like the one shown will, in many cases, meet the requirements. The base wire in this instance is made with a loop in the center just posterior to the central incisors, and anchored to a tooth on each side of the arch as described. A spring is then attached to the

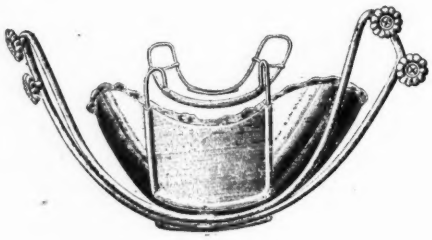

Fig. 14.

Fig. 15.

base wire just anterior to the crib portion on each side in the usual manner, and extended forward to the lingual surface of the teeth to be moved. A collar with a lug is often placed on an incisor or other tooth to steady the spring. The pressure is controlled by opening the loop and bending the springs outward. Fig. 17 exemplifies the method employed to force into line a left superior lateral incisor that was far inside the arch and out of proper position. At the same time the arch was to be spread to some extent. A crib was formed about the first bicuspid on each side of the arch, and to the crib was soldered a base wire that was shaped to the curve of the lingual surface of the teeth. A spring was then

fastened to the base wire near the right bicuspid and extended forward, forming a spring which passed beneath a lug soldered to a collar on the lateral. The same system was employed to move a central incisor out into line, the crib being attached to the temporary molar. In each case the teeth were moved into position in a very limited time.

"In Fig. 18 it will be seen that the right superior incisor is too prominent and the left incisor not prominent enough, and is partially rotated. The irregularity was corrected by making a crib with which to clasp the second right superior temporary molar. A spring extended from the crib to the front of the

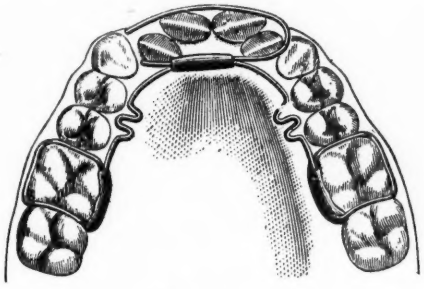

Fig. 16.

Fig. 17.

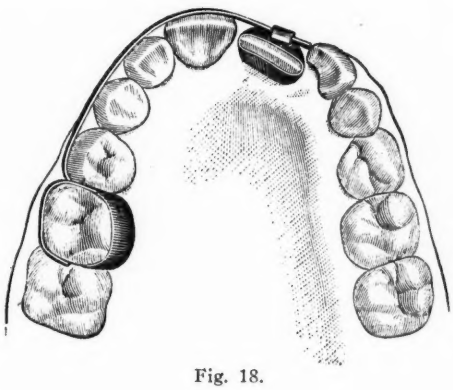

Fig. 18.

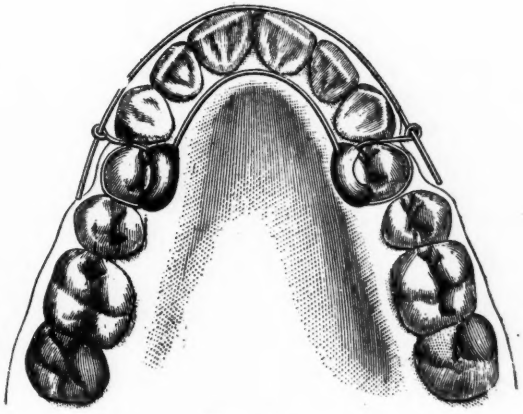

Fig. 19.

arch, following the labial surface of the teeth near the gum line, and was formed to pass the right incisor and to extend into a tube soldered to a collar placed on the left incisor.

"Fig. 19 shows a very convenient method of regulating the V-shaped arch, by forming a base wire (with or without a loop or corrugation), which is shaped to the lingual side of the teeth, and anchored to one or more teeth on either side by a crib, to the labial side of which should be attached a hook or eyelet to sustain a straight bar of spring wire that is sprung over the front of the teeth for the purpose of flattening the shape of the arch. The tendency of the wire to straighten itself exerts a pressure backward on the front teeth, and at the same time assists in spreading the arch.

"Respecting this entire crib and spring wire system, special stress is laid on the following facts: (A) The materials—piano wire, Tagger's tin, sheet copper, copper wire, tin and soft solder—are inexpensive, and within the reach of all. (B) The crib and spring construction is simple and quickly done. (C) The clinging grip of the crib on its anchorage is sufficient to hold the fixture firmly, yet it is easily sprung off for cleansing or change. (D) Changes or additions are easily and quickly made. (E) The structure is light, cleanly, and occupies the least possible space in the mouth. (F) Its action is controllable, and free from risk of overaction. (G) It forms a perfect retainer." The following are a few of the appliances used by Jackson at the time (Figs. 20 and 21):

At the *World's Columbia Dental Congress,* 1893, the following paper was read: *Method of Constructing Spring Appliance for Correcting Irregularities of the Teeth.* Most of the principles used in this paper have already been shown. In conclusion Jackson replied, "Before I conclude, let me recapitulate what I consider the indispensable advantages of the system I have described:

Fig. 20.

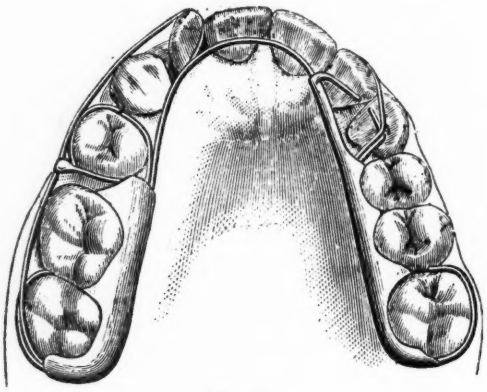

Fig. 21.

"First. It does away with plates covering the roof of the mouth.

"Second. Although the anchorage is sufficiently firm for all practical purposes, the appliance may readily be removed by the patient. An aid to cleanliness.

"Third. The materials, German silver, Tagger's tin, piano and German silver wire, and soft solder, are cheap and easily obtained.

"Fourth. The crib and spring construction is simple and quickly prepared, and changes and additions are easily made.

"Fifth. The appliance requires less attention than those ordinarily used, and thus there is a saving of time.

"Sixth. Many of the springs described can be utilized to advantage in combination with a rubber or metal plate.

"Seventh. The whole or part of the appliance can be made of precious metals if desired.

"I freely give the results of my study to the profession.

"Beyond copyrighting this paper I reserve no exclusive rights in the sys-

tem to which I have devoted years of thought and labor. I need not rehearse to this audience the perplexities and unforeseen obstacles which are at once the bane and the fascination of scientific research.

"How far I have succeeded in conquering the difficulties in my path let others judge. The story of man's contest with the forces of nature is as old as the world. No one is more familiar with it than the members of our profession, who work to relieve their fellow beings of the consequences sometimes of misfortune, sometimes of folly.

"But though no letters patent protect me in the material advantages of my method, I am not without a great reward; I shall find it in the knowledge that I have in a manner aided the work to which we give the best part of our lives: the best product of our knowledge. If my professional brothers find the system I have outlined a help in their practice and a step along the road of progress, I am amply repaid for what I have done.

The following illustrations are taken from various papers and need no explanations.

In 1904 Dr. Jackson brought all of his material that had been published in various journals together and published his book entitled: *Orthodontia and Orthopaedia of the Face.* Under *Bodily Tooth Movement,* page 309, he says:

"Early in practice I moved the incisor teeth bodily, both anteriorly and posteriorly, without changing their angle. [See *Dental Cosmos,* 1887, page 385, and 1888, page 512.] *Dr. Jackson:* "At some future time I will describe my method of carrying the incisors forward bodily without changing their angle." *Cosmos,* 1887. Dr. Jackson: "I expected to present here today a method of carrying front teeth forward and retaining them in position. I believe that teeth can be moved bodily without injuring to any great extent their pulps. I have succeeded in carrying them to some distance. I have caused the death of pulps by carrying the teeth too great a distance, and too rapidly, however. We must consider when the lower arch is much larger than the upper, there has been from some cause an arrest of development in the upper. How does this upper jaw expand and enlarge? It is by the growth of the palatal bones from the edges, as well as by the interstitial growth spoken of by Wedl; and if we begin the regulating early in life we encourage that deposit which is necessary to enlarge the upper arch to the required size, or comparative size, of the lower one." *Cosmos,* 1888.

"In but a small percentage of the cases presented for treatment requiring the incisors to be moved outward or inward is it found necessary to adapt special apparatus and move them bodily, and again but a few of the cases that are so treated meet the full expectations of the operator, especially when the operation is performed upon an adult. After the teeth and bone have been moved, in the healing process there is always a contraction similar to the contraction of scar tissue after a wound; and if an ordinary retainer is applied which does not hold the teeth bodily, this condition will force the roots of the teeth towards their original position, which gives an unpleasant appearance of their crowns. Mov-

ing all of the incisors outward at any time by force applied to their crowns carries more or less of the alveolar process with them, particularly the outer table. With young patients the stretching of the premaxillary bone encourages its development. The suture between the premaxillary and the palatal processes of the maxillary bones is not fully united in early childhood. Flat bones grow from their edges. The premaxillary may be numbered with this class; during its development it can be encouraged by pressure to take on a different form, and therefore better results are obtained if the change is made while alveolar process and jaws are in this active stage of development. In any case, the continued retention of the teeth in their new position for a considerable length of time, to permit the process to become firm around them, is essential. This is sometimes difficult to accomplish while the bones and process are still developing and before the bicuspids are fully erupted. Space for the accommodation of the permanent cuspids should be constantly preserved. If the deciduous cuspids are absent, with insufficient room for the permanent ones at about the time of their eruption, the case should be carefully examined to determine whether the roots of the lateral incisors are sufficiently in front of the incoming cuspids to permit the latter to take a correct position. The roots of the lateral incisors are somewhat flattened laterally, and they should be located so that the incoming cuspids will not rotate them. These precautions are necessary when the anterior region of the upper arch is not sufficiently prominent to harmonize the features. It is difficult sometimes to determine fully before the tenth or twelfth year how the jaws are going to harmonize as to their fullness, and when the deformity is not very marked it is usually advisable to defer operating until a satisfactory diagnosis can be made.

"*Outward Bodily Movement of Incisors.*—The first appliance that I devised for moving the teeth bodily outward was made for improving the position of four upper incisors. A metal cap of No. 28 gauge, made with accurate metal dies, was attached to the incisors. To the lingual side of the cap near the gum were soldered two heavy wire arms, extending backward and following the inner curve of the arch, one on either side, near the bicuspids and molars. Holes were made in the labial and lingual sides of the cap, in position to accommodate wire ligatures passing between the teeth near the margin of the gum. The cap was fastened to the teeth by first passing the ligatures between them and the holes in the edge of the cap, drying the teeth carefully, and setting the cap with cement, hastily drawing the ligatures up firmly and twisting their ends. The anchorage for moving the teeth was secured by shaping a partial vulcanite plate to the palatine arch, covering the arms described. In these places the plate was thickened, forming grooves, extending from front to back on the lingual side, for the accommodation of the arms.

"The plate was retained with wire-clasps passing around the first bicuspids and first molars. Each arm had a small projection or knob soldered to the side of it made long enough to project through the surface of the plate to engage with springs for supplying the force, the plate being dressed away in these

parts down to the grooves to expose the knobs, and to form a short slot in front of them to permit the movement. Two springs for this purpose, one on either side, were attached to the anterior third to the plate, and shaped to the double curve to extend back of and engage with the distal side of the knobs on the arms, thus giving the desired pressure forward.

"Several methods of making attachment to the teeth will be described. To the incisors a fixed attachment may be made with collars, soldering to them a heavy lingual base-wire, with the ends extending backward in the form of arms; or by arranging on the inner curve on each side of the arch a forked arm, one

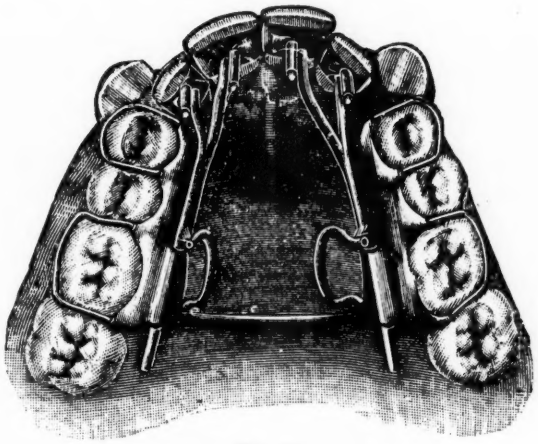

Fig. 22.

Fig. 23.

Fig. 24.

Fig. 25.

Fig. 26.

of the forks being soldered to a broad collar previously fitted to the central, and the other soldered to a similar collar on the lateral. With the arms forked in this manner, the collars are easily adjusted for cementing. The free ends of the arms project backward to be supported, and engage with springs in a plate in the manner mentioned; or force can be applied from a metal anchorage. To make the long arms removable for cleansing, etc., (Fig. 22), solder a strong short arm to the lingual side of each of the collars, or to a metal cap, the arms pointing backward parallel one with the other, to project into strong tubes at-

tached to a lingual base-wire, or to forked arms. The tubes, if required, should be a little larger in the mesio-distal diameter to allow for any side variation in the line of the posts, and to permit of easy removal. This connection can be made in the reverse manner by soldering the tubes to the collars, and the arms shaped to project into the tubes. The anchorage usually consists of spring-clasp attachments to the first bicuspids and first molars, the sides being connected by a palatine base-wire. Each end of the base-wire, a tube, and one end of a U-shaped spring pointing towards the roof of the mouth, are soldered to the partial-clasps opposite the molars, the tubes being properly placed for the support of the arms. Each arm is provided with a flange to engage with the free end of the spring. Force is applied by bending the ends of the springs forward.

"Later the system of attachment of the arms to the teeth was simplified by soldering horizontally to the lingual side of each of the collars a small loop of flat or round metal, to engage with suitably shaped spurs projecting downward

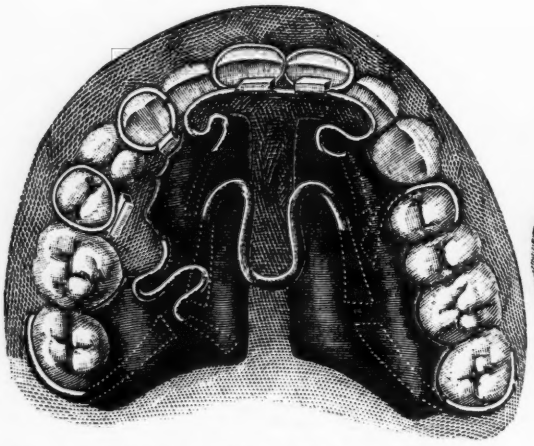

Fig. 27.—Jackson's modified split plate of vulcanite.

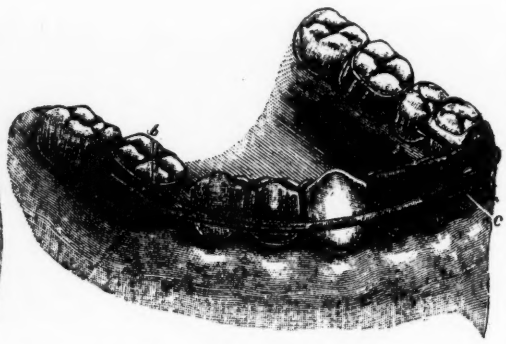

Fig. 28.—A device for moving forward a lower or upper molar.

and forward from the anterior part of a lingual base-wire. This attachment is in effect like a hinge that comes to a full stop when the distal part of the arm is pressed into place. It holds the teeth in the same relationship to the base-wire when force is applied, but it is easily unhooked for removal.

"This form of attachment is also available for moving the incisors bodily inward by reversing the hinged attachment to the base-wire arms, having the loops or eyelets near the necks of the teeth.

Fig. 23 illustrates another method of making an attachment on this principle. To each of the incisors to be moved is cemented a collar with a hook-shaped flange on the lingual side nearly as broad as the width of the tooth, and bent at a right angle towards the gum to engage with spurs projecting downward from a lingual base-wire.

"When the incisors are nearly in a line, cementing to them a swaged metal cap, covering all of the teeth to be moved, is sometimes preferable to the use of collars (Fig. 24).

"The base-wire is attached to the cap in an adjustable manner by soldering one or more loops to the lingual side of the cap to engage with spurs on a base-wire. One loop should be placed at the median line, and a shelf-like projection near each of the distal ends to support and hold the cap and bar in the same relationship as force is applied; or a short post may be soldered to the disto-lingual sides of the cap to engage with tubes on the base wire.

"Another method of making this connection is illustrated in Fig. 25. A large semicircular wire is soldered to the lingual side of the cap near the gum, with the end projecting a little. To a lingual base-wire of the same curve is attached one or more flanges that project upward and curve outward to engage

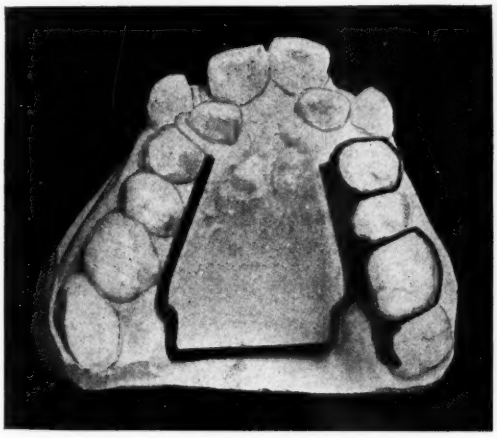

Fig. 29.—Expanding the posterior region on one side.

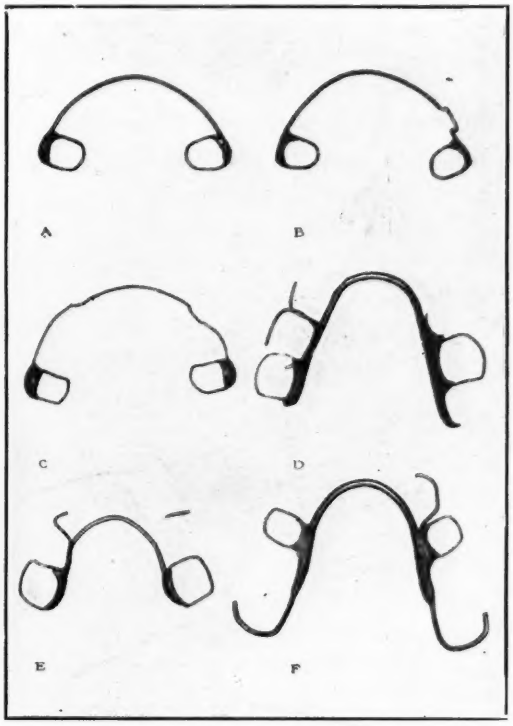

Fig. 30.—Jackson's retaining appliance. (Plate 34, Jackson's Orthodontia.)

with the upper surface of the semicircular wire attached to the cap, the base wire being removable as described. As force is applied, the flanges lock with the semicircular wire on the cap.

"Several variations from these forms of attachment have been devised. One that has proved convenient is made by soldering two horizontal planes to the lingual side of a cap, as illustrated in Fig. 26. The planes are formed of two pieces of plate-metal cut on a curve, the space between the planes being just sufficient to pass either side of the base-wire."

Dr. Jackson has read various papers before nearly all the prominent dental societies of this country and Europe, but as the principles of his methods are the same, it will be impossible to review all of them in this work, especially as this work extends only to the period of 1900.

VARIATIONS IN POSITION OF THE TEETH IN NEW WORLD MONKEYS*

By J. F. Colyer, F.R.C.S., L.D.S.

In a paper published in the *Dental Record* (January, 1914) attention was drawn to several specimens illustrating variations in position of the teeth in monkeys. Since the appearance of that paper a systematic examination has been made of monkeys in the British Museum, in the Royal College of Surgeons, and in a private collection. The British Museum furnished by far the largest number of specimens, and these with but few exceptions are from animals in the wild state. In all, just over 1,500 specimens have been examined, and the facts gathered are, I think, of sufficient interest to warrant their publication. It is, however, impossible to do justice to the subject in one paper, and I propose to-night to limit my remarks to the monkeys of the New World, which are divided by zoologists into two families: (1) Cebidæ; (2) Hapalidæ. In all 629 adult specimens were examined, those specimens being classed as adult in which the dentition had reached the stage where the third molars and canines were partly erupted.

With these few preliminary remarks we may pass to a detailed account of the variations seen in the different genera.

FAMILY CEBIDÆ

Genus *Cebus* (the Sapajous or Capuchin Monkeys).

Specimens examined, 146.

The typical arch in *Cebus* is shown in Fig. 1. In the maxilla the teeth are placed slightly oblique to the line of the arch, and are arranged in a curve, the greatest convexity of which is in the region of the first molar; in the mandible there is a somewhat similar arrangement. The following variations were noted:

(*a*) Slight crowding of the incisors, two cases[1] being noted in the maxilla and two[2] in the mandible.

(*b*) Slight outward displacement of a right maxillary canine in a male *Cebus leucocephalus.*[3]

(*c*) Irregular arrangement of premolars. In *Cebus* the mandibular first premolar is frequently a little oblique to the line of the arch, the distal aspect of the tooth pointing inwards; in two specimens the obliquity was sufficiently marked to constitute a definite irregularity. In four specimens there was an irregular arrangement of the premolars; in one case, a male *Cebus hypoleucus,* Fig. 2, both the maxillary and mandibular premolars were crowded. In another specimen, a *Cebus apella,* Fig. 3, there was a definite irregularity of the maxillary left first premolar. In this specimen the canine had erupted slightly for-

*Read at a meeting of the Section of Odontology of the Royal Society of Medicine, held February 24, 1919.

Reprinted from British Journal of Dental Sciences, December, 1919, and January, 1920.

[1] *Cebus apiculatus* (B.M. 10.11.10.1)*; *Cebus fatuellus peruanus* (B.M. 0.11.5.2).

*B.M., abbreviation for British Museum.

[2] *Cebus* unclassified (B.M. 8h); *Cebus hypoleucus* (R.C.S. Odonto Series).

[3] B.M. 44.1.18.32.

ward and external to the normal position. There was no evidence that the malposition of the premolar was due to persistence of a fragment of a deciduous molar. In two cases the mandibular premolars were crowded.

(*d*) In *Cebus* the third molars occlude either edge to edge or the maxillary teeth lie a little internal to the mandibular teeth. The latter condition may be exaggerated, and in four cases one or both of the maxillary teeth occluded well inside the mandibular teeth. In six specimens the second and third molars on one or both sides were placed internal to the arch (Fig. 4), three examples being met with in *Cebus apella.* In one specimen, Fig. 5, all the molars were placed slightly internal to the line of the premolars.

(*e*) In *Cebus* there would seem to be a tendency for the molars to be rotated. In the normal, as previously stated, the cheek teeth are placed slightly oblique to the line of the arch. This oblique position may be sufficiently increased to constitute a definite irregularity, as shown in Fig. 4. Here the third

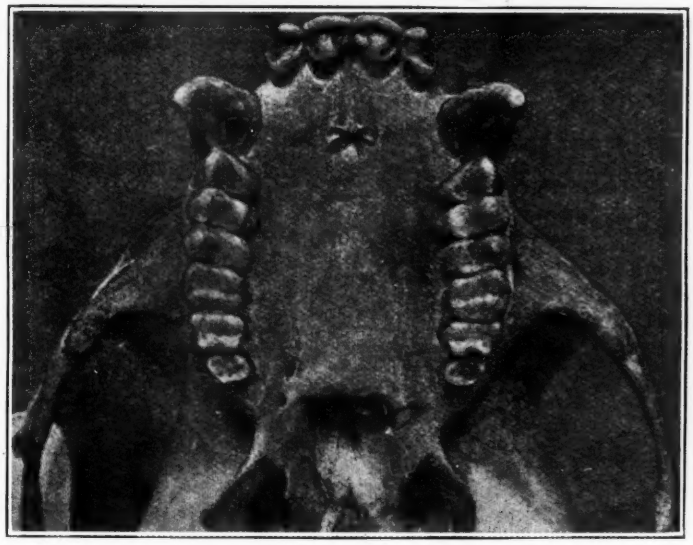

Fig. 1.—Typical arch in *Cebus.*

molars are rotated so that the anterior external angles are brought in contact with the distal aspects of the second molars. In one specimen[1] the maxillary right second molar was distinctly rotated, this irregularity being associated with slight crowding of the incisors.

(*f*) In three specimens a curious "échelon" arrangement of the molars was present, the teeth being placed with the anterior-external angle slightly inwards as shown in Fig. 6.

(*g*) In the mandible the third molar is placed with the roots sloping backwords: this backward slope may be increased sufficiently to result in a forward tilting of the tooth. This irregularity was noted in two cases;[2] in one, shown in Fig. 7, both third molars were tilted and rotated inwards.

[1]*Cebus fatuellus peruanus* (B.M. 0.11.5.2).
[2]*Cebus hypoleucus* (B.M. 4.7.6.2); *Cebus xanthocephalus* (B.M. 49b).

(*h*) In four cases there was slight inferior protrusion, the mandibular incisors occluding in front of the maxillary teeth.

From the above it will be apparent that there is a wide range in the variations in position of the teeth in *Cebus,* the number of specimens showing variation being thirty-six, the majority being in connection with the molar series.

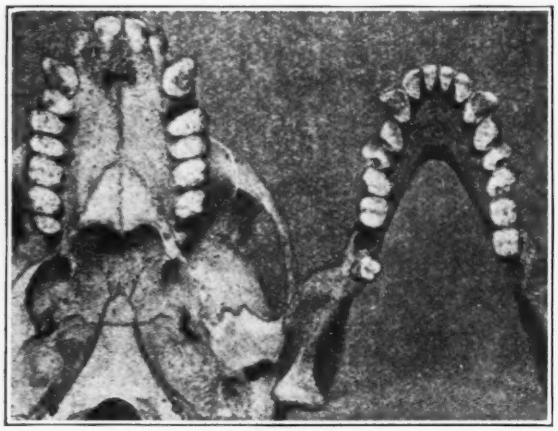

Fig. 2.—*Cebus hypoleucus* (B.M. 2.3.5.15), from Coiba Island, W. of Panama. This specimen shows a general irregularity of the premolars.

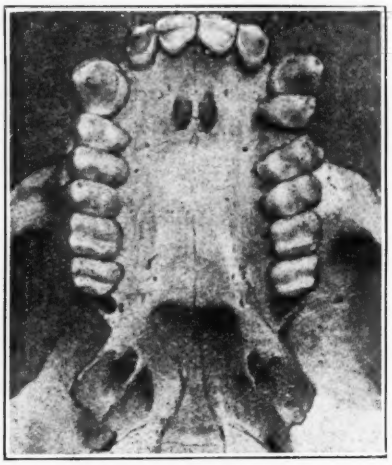

Fig. 3.—*Cebus apella,* showing a misplaced maxillary left first premolar.

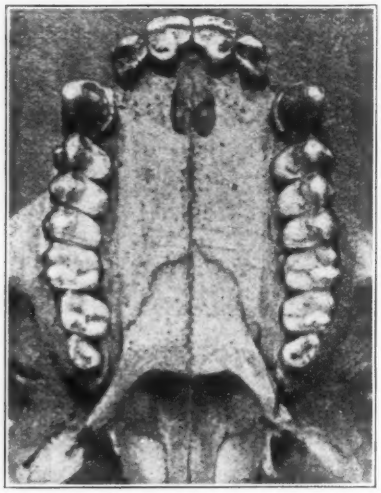

Fig. 4.—*Cebus hypoleucus* (B.M. 68.7.9.1). In this specimen the maxillary right second and third molars are placed internal to the line of the arch.

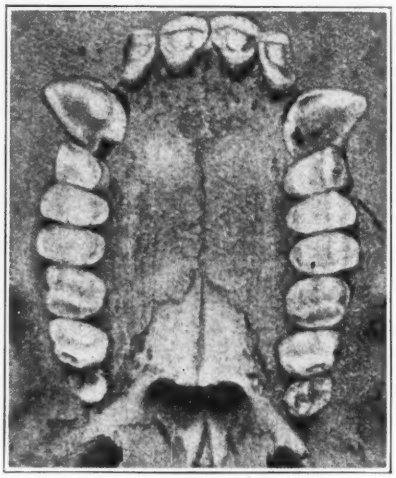

Fig. 5.—*Cebus* unclassified (B.M. 3.9.4.19). In this specimen all the molars are placed internal to the line of the premolars.

In addition to variations in position, five cases of absence of teeth were seen, and in twelve cases the mandibular first premolar was abnormally large, facts which seem to suggest that the genus *Cebus* is in a "changeful mood."

Genus *Lagothrix* (the Woolly Monkeys)

Specimens examined 29.

The Woolly monkeys, first described by von Humboldt, "take their name from the thick coat of woolly fur which is found beneath the longer hairs."

(1) In this genus five specimens exhibited an irregular arrangement of the premolars. In one, a *Lagothrix Humboldtii,* Fig. 8, there was a definite outward displacement of the maxillary left third premolar. In another specimen, Fig. 9, the maxillary left third premolar was rotated so that the external aspect looked backwards; on the opposite side of arch a space was present between the maxillary first molar and third premolar. In a third specimen a *Lagothrix infumatus,* Fig. 10, there was a definite asymmetry of the facial bones. On the right side (i) the maxillary canine rested in occlusion over the mandibular first and second premolars; (ii) there was crowding of the premolars; (iii) the third molar was misplaced with the occluding surface looking well backwards. There was a definite cross-bite of the incisors, the mandibular right incisors passing in front of the maxillary teeth. The general appearance of the bones suggested an arrest in growth of the right maxilla. Of the two remaining specimens showing irregularity of the premolars, in one,[1] the maxillary first premolars were

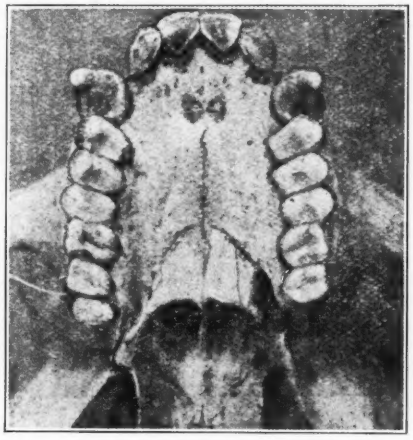

Fig. 6.—*Cebus* unclassified (B.M. 5.5.24.2) to show "échelon" arrangement of the maxillary right molars.

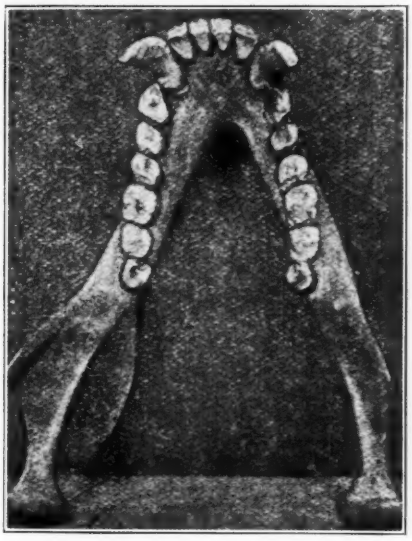

Fig. 7.—*Cebus xanthocephalus* (B.M.49b). The mandibular third molars are tilted and rotated inwards.

slightly internal to the arch, and in the other[2] the mandibular first premolars were placed almost transverse to the arch, definite spaces being present between these teeth and the canines.

(2) In one specimen[3] there was an abnormal backward slope of the roots of the maxillary third molars.

(3) In no less than eight specimens the mandibular incisors occluded in front of the upper teeth, a fact which suggests that in this genus there is a definite tendency towards inferior protrusion.

The total number of specimens varying was eleven.

Genus *Brachyteles* (the Woolly Spider Monkeys).

Specimens examined 13.

[1] *Lagothrix Humboldtii* (B.M. 43.10.21.12).
[2] *Lagothrix* unclassified (B.M. 11.7.19.1).
[3] *Lagothrix infumatus* (B.M. 57.10.17.10).

This genus, which is confined to South-east Brazil, forms a kind of connecting link between the *Lagothrix* and the *Ateles.*

(1) The chief interest in this genus lies in the frequency of inferior protrusion. Of the thirteen specimens nine were marked as coming from the

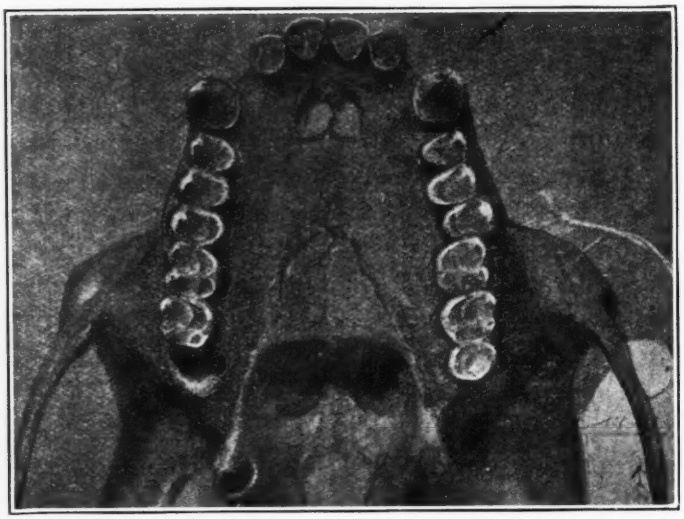

Fig. 8.—*Lagothrix Humboldtii* (B.M.95.8.1.4). The maxillary left third premolar is misplaced.

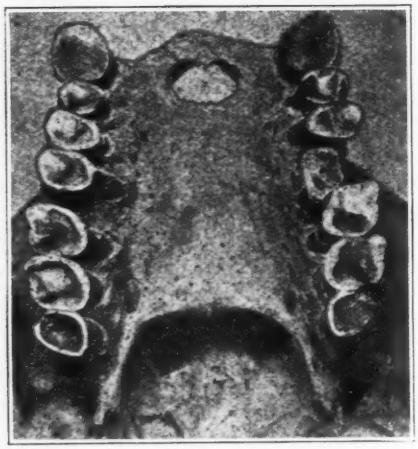

Fig. 9.—*Lagothrix* unclassified, from Marcopata (B.M.0.11.5.15). The maxillary left third premolar is misplaced.

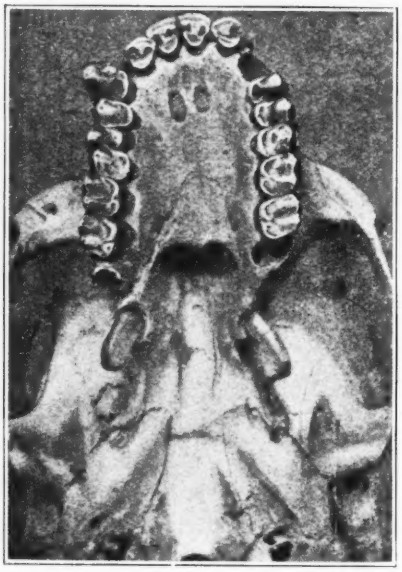

Fig. 10.—*Lagothrix infumatus* from Upper Ucayali (B.M.66.3.28.7), showing asymmetrical growth of the maxillæ.

Eugenhero River, Espirito Santo. In this group there were seven examples of protrusion of the mandibular incisors; in one the condition was doubtful owing to the postmortem loss of the incisors, and in one the incisor bite was edge to edge. Of the four specimens not marked as coming from the Eugenhero River, only one showed inferior protrusion.

(2) In one specimen the diastema in the maxilla was absent.

(3) In two specimens there was slight crowding of the mandibular premolars, and in one slight irregularity in the position of the maxillary right first molar and third premolar.

(4) In a *Brachyteles hemidactylus*[1] an additional premolar in the right maxilla had caused the maxillary canine to assume a forward position and the mandibular canine to be misplaced.

The number of specimens varying was eight.

Genus *Ateles* (the Spider Monkey).

Specimens examined 30.

The Ateles or spider monkeys show a remarkable degree of variation.

(*a*) In two cases the presence of extra teeth had led to irregularity of the canines.

(*b*) In a male *Ateles vellerosus*[2] there was marked irregularity of the maxillary premolars (Fig. 11). On the left side the third premolar was almost ex-

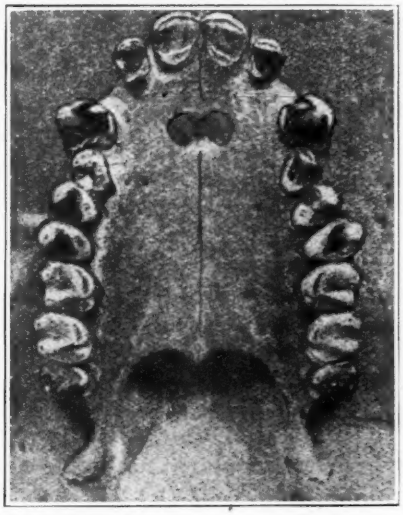

Fig. 11.—*Ateles vellerosus* (B.M.89.12.7.2). The maxillary premolars are misplaced.

ternal to the bite, while the canine seemed to be placed more posteriorly than normal. In the mandible a slight space existed on both sides between the first and second premolars.

(*c*) A rare condition was noted in an *Ateles melanochir*.[3] The mandible was distinctly asymmetrical; on the left side the cheek teeth were in normal occlusion; on the right side the mandibular teeth occluded external to their normal position.

(*d*) Among other irregularities noted were crowding of the incisors; a slight space between the maxillary left first and second molars; tilting of the mandibular third molar.

[1]B.M. 45.4.2.7.
[2]B.M. 89.12.7.2.
[3]B.M.808a

The total number of specimens showing variations in position of the teeth was eleven; in two of these extra teeth were present. In three further specimens additional teeth were noted, making a total of fourteen out of thirty speci-

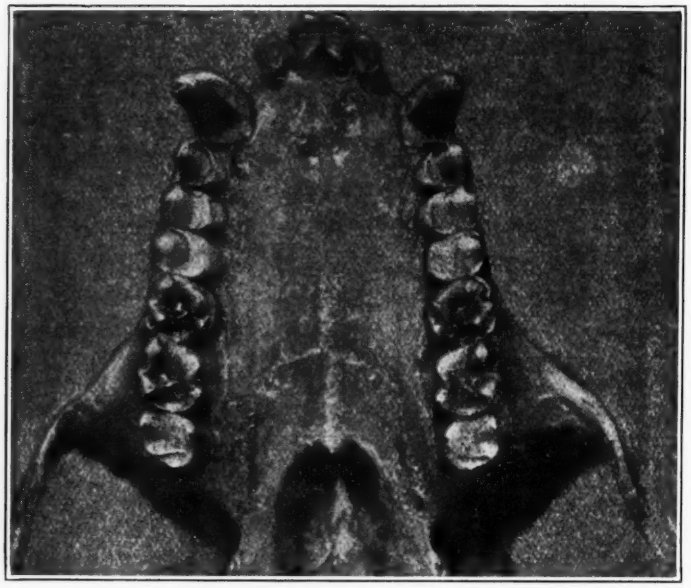

Fig. 12.—Typical arch in *Mycetes*.

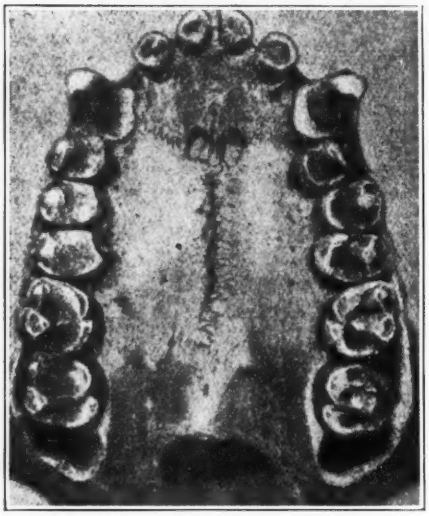

Fig. 13.—*Mycetes* unclassified (B.M.51.4.23.1). Showing irregularity in position of the premolars.

mens showing dental variations. The tendency to vary would appear to be greater in certain species, for example:

In three specimens of *Ateles melanochir*	..	..	2 varied
In four specimens of *Ateles vellerosus*	..	..	3 "
In six specimens of *Ateles niger*	..	..	2 "

[1]B.M. 808a.

Genus *Mycetes* (the Howling Monkeys).

Specimens examined 106.

In *Mycetes* the incisors are small compared with the size of the skull and are set in a curve; there is usually a well-marked diastema; the premolars and molars are arranged in a straight line, the two sides gradually diverging as they approach the back of the mouth. A typical arch is shown in Fig. 12.

The variations seen were as follows:

(*a*) Slight crowding of the premolars; in three cases both maxillary and mandibular premolars were involved—in four cases only the maxillary premolars. An example is shown in Fig. 13. Three out of the seven cases were in *Mycetes seniculus.*

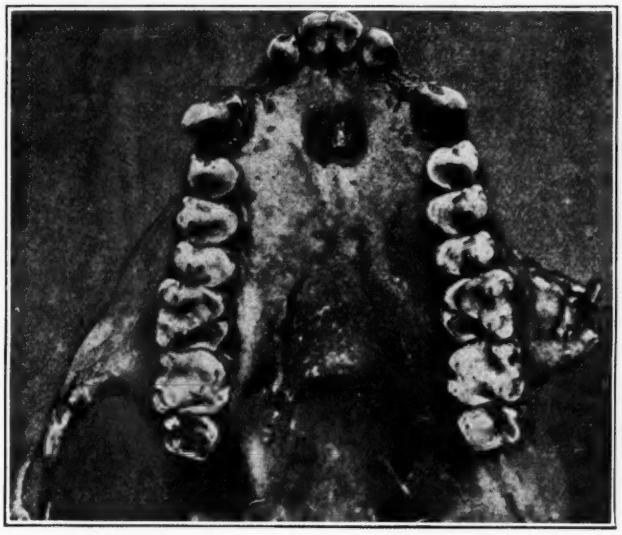

Fig. 14.—*Mycetes niger* (B.M.50.9.6.14). In this specimen the premolars are placed internal to the line of the molars.

(*b*) In six specimens a curious arrangement was present, the premolars and molars being arranged in straight lines with the line of the premolars lying internal to that of the molars as seen in Fig. 14.

(*c*) In a *Mycetes niger,*[1] Fig. 15, the maxillary left first premolar was placed internal to the second premolar; the canine was not present but the condition of the bone suggested that this tooth had been lost from injury, the central incisor was malformed, and it is therefore possible that the irregular position of the premolar in this specimen was due to trauma.

(*d*) An abnormal spacing of the teeth was present in six specimens. In one case there was a marked space between the maxillary central incisors; in three cases spaces were present between the central and lateral incisors in both the maxilla and the mandible; in one case spaces existed between the mandibular second and third premolars; in one case definite spaces were present between the

[1]B.M. 51.8.12.8.

maxillary third premolars and first molars, the mandibular third premolars in this specimen being transverse to the arch.

(*e*) Rotation of the mandibular third molars. In five cases the antero-internal angle was rotated inwards; in one case the anteroexternal angle was rotated outwards. It is of interest to note that five out of the six specimens belonged to the species *Mycetes palliata.*

(*f*) Protrusion of the mandibular teeth was present in forty-five cases. The various species show a different degree of variation in this direction, for example:

Species	Number examined	Number showing inferior protrusion
Mycetes palliata	20 ..	.. 12
Mycetes Macconnelli	4 ..	.. 3
Mycetes ursina	11 ..	.. 1

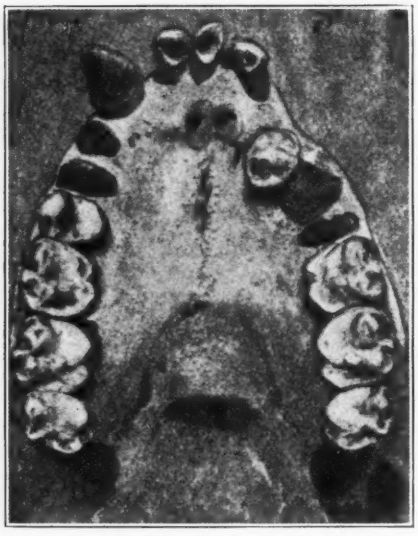

Fig. 15.—*Mycetes niger* (B.M.51.8.12.8). Showing irregular position of the maxillary left first premolar.

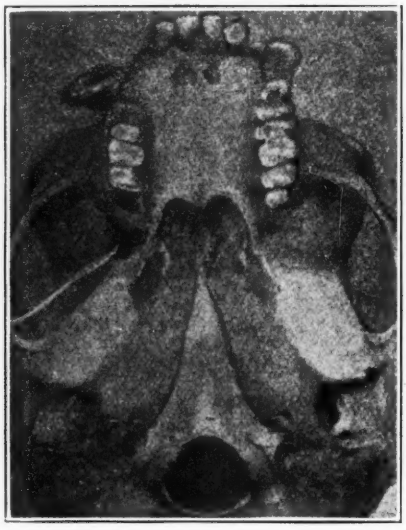

Fig. 16.—*Chrysothrix sciureus* (B.M.8.3.7.14). The maxillary right canine is misplaced.

(*g*) The diastema in the maxilla was absent in two cases.

The total variations noted were forty-four.

Genus *Chrysothrix* (the Squirrel Monkeys).

Specimens examined 52.

In this genus only three variations were present, as follows:

(*a*) Irregular position of both maxillary and mandibular premolars.

(*b*) Irregular position of mandibular premolars; the maxilla being too defective to obtain reliable data.

(*c*) Irregular position of the maxillary right canine in a *Chrysothrix sciureus*[1] from the Coast Region, Demerara, Fig. 16.

[1]B.M. 8.3.7.14.

Genus *Callithrix* (the Titi Monkeys).

Specimens examined 40.

In this genus the incisors are set in a well marked curve; the canines are not so well developed as in many of the monkeys and are separated from the lateral incisors by a small diastema, which is often entirely absent. The premolars and first molars run backwards and outwards, the second and third molars turning slightly inwards. The arch approximates in character that seen in man. The following variations were noted:

(*a*) Irregularity in position of the incisors. When the teeth are in occlusion the maxillary incisors are often a little in advance of the mandibular teeth, but there is a tendency for the maxillary lateral incisors to be placed slightly internal to the arch, and in some cases to be overlapped by the distal edge of the mandibular teeth, or to lie in the space between the mandibular lateral incisors and canines. This inward position of the maxillary lateral incisors may be so marked as to constitute an irregularity. An example of crowding of the mandibular incisors was noted in *Callithrix gigot*[1] and in two specimens spaces existed between the mandibular incisors.

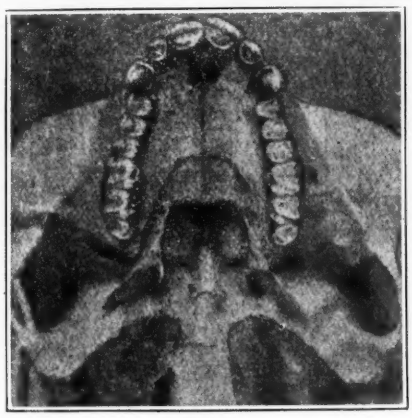

Fig. 17 (i.)

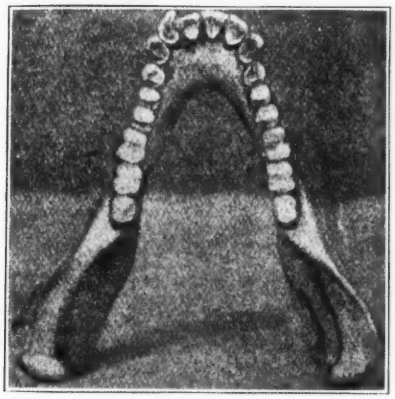

Fig. 17 (ii.)

Fig. 17.—*Nyctipithecus* unclassified (B.M.14.4. 25.30). Showing irregularity in position of the maxillary and mandibular incisors.

(*b*) Irregularity in position of the premolars. In one case the mandibular left canine and premolars were misplaced, the maxillary right premolars were internal to the line of the molars and the lateral incisors were slightly internal to the arch.

(*c*) Inferior protrusion was present in only one specimen (*Callithrix caligatus*).[2]

The number of specimens showing variations was ten.

Genus *Nyctipithecus* (the Nocturnal Owl-faced Monkeys).

Specimens examined 35.

Variations were noticed in two specimens, as follows:

[1]B.M. 3.9.5.7.
[2]B.M. 8.5.9.8.

(*a*) Slight overlapping of the maxillary central incisors with the mandibular left incisor in advance of the corresponding tooth in the maxilla.[1]

(*b*) Slight crowding of the maxillary premolars.[2]

Genus *Brachyurus* (the Oukari Monkeys).

In the eleven specimens examined, the arrangement of the teeth was normal.

Genus *Pithecia* (the Saki Monkeys).

In *Pithecia* the maxillary incisors are set in a sharp curve; there is a wide diastema, with the canines placed at the corner of the arch. The line of the cheek teeth commences slightly internal to the canine and follows a direction slightly inwards and then outwards. Insufficient space in the region of the premolars results in the second and third premolars being pushed inwards to the arch, a condition noted in four specimens.

The only other irregularity noted was in *Pithecia chiropotes*,[3] in which the maxillary first premolars were transverse to the arch instead of oblique, as in the normal.

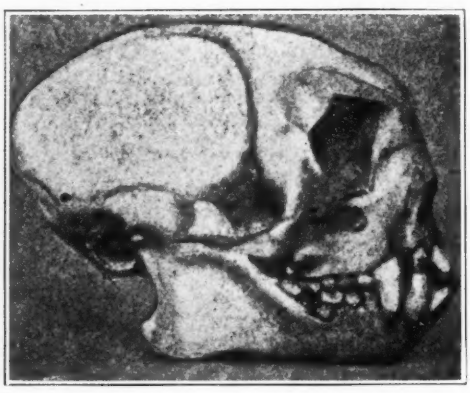

Fig. 18.—*Midas* (B.M.0.7.7.2).

FAMILY HAPALIDÆ

Genus *Midas* (the Long-tusked Marmosets or Tamarins).

Specimens examined 84.

In this genus five specimens showed variations in position of the teeth; in four of these the irregularity was only slight but in one a remarkable condition was present. The skull was marked as coming from the Perent River and is shown in Fig. 18.

The mandibular right canine strikes the labial aspect of the maxillary lateral incisor; the mandibular incisors are pushed over to the left side: the maxillary right canine in occlusion lies over the mandibular first and second premolars; the teeth in the right half of the mandible, with the exception of the second molars, are in abnormal occlusion.

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[1] *Nyctipithecus* unclassified (B.M. 14.4.25.30).
[2] *Nyctipithecus trivergatus* (B.M. 2.2.1.9).
[3] B.M. 8.3.7.6.

Genus *Hapale.*

Specimens examined 43.

Three specimens showed variation; in one the incisors were crowded, in a second the mandibular premolars were irregular, and in a third a space existed between the maxillary central and lateral incisors on both sides, the mandibular lateral incisors having grown up into the spaces.

The following table gives the number of variations in the position of the teeth in the various genera:

VARIATIONS IN THE POSITION OF TEETH IN NEW WORLD MONKEYS

	Number examined	Variations other than inferior protrusion	Number showing inferior protrusion	Total number varying
FAMILY CEBIDÆ				
Cebus	146	34	3	36
Lagothrix	29	6	8	11
Brachyteles	13	5	8	8
Ateles	30	11	0	11
Mycetes	106	28	25	44
Chrysothrix	52	3	0	3
Callithrix	40	9	1	10
Nyctipithecus	35	2	0	2
Brachyurus	11	0	0	0
Pithecia	40	5	0	5
—	502	103	45	130
FAMILY HAPALIDÆ				
Midas	84	5	0	5
Hapale	43	3	0	3
—	127	8	0	8

The points to be noted are:

(1) The degree of variation in the Cebidæ compared with the Hapalidæ.

(2) The degree of variation in the various genera of Cebidæ.

DEPARTMENT OF
ORAL SURGERY AND SURGICAL ORTHODONTIA

Under Editorial Supervision of

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MOUTH INFECTION AS A SOURCE OF SYSTEMIC DISEASES*

By M. N. Federspiel, D.D.S., M.D., F.A.C.S.
Professor of Oral Surgery, Marquette University Dental School, Milwaukee, Wis.

THE study of the relationship between ill health and defective teeth is, by no means, recent. It has received casual mention in the older literature and has been recognized for a long time by some practitioners of medicine and dentistry. The subject has, however, not received the prominence it deserves, although a good many practitioners have been giving this matter a thorough study and now do not complete case histories unless they have a detailed report on the pathologic conditions that exist in and adjacent to the teeth.

The development of this knowledge marks a great practical advance in the diagnosis and treatment of disease. It is now apparent that many disorders which heretofore were considered obscure in origin and incurable are due wholly or in part to chronic infection, and that such diseases can often be cured, or at least the progress of the disease retarded, by the removal of the primary source of infection.

Chronic sepsis is far more frequent than was formerly supposed. It is now conceded by eminent specialists that few of mature age are wholly free from it. Among individuals examined by Dr. Arthur Black, without reference to complaint, the percentage of periodontal infections was 56 for persons under 25 years of age, 72 for those between the ages of 25 and 30, 87 for those between 30 and 40, 89 for those between 40 and 50, and 100 per cent for individuals over 50 years of age. There is, of course, some variation in statistics reported by different observers. This is due in part to the class and age of the patients examined and in part to slight differences of the basis upon which the diagnosis of sepsis is made.

It is now generally agreed, however, that dental sepsis is one of the most common of the chronic active infections and for this reason ranks theoretically as a very frequent cause of ill health.

*Read before the Milwaukee Surgical Society, November 3, 1919.

Duke reports that oral sepsis as a focus of chronic active infection may be a source of ill health in many different ways. It may harbor and distribute organisms which, under certain conditions, may infect other tissues and give rise to acute or chronic inflammatory lesions. It may have a toxic effect with ensuing disease in both normal and diseased organs. This effect in healthy individuals may perhaps be slight; it may be decidedly harmful, however, in individuals who are depleted by disease. It may also cause functional disturbance in relatively normal organs by furnishing an alien protein to which an individual may have become highly sensitized. In the same way it may increase functional disturbances due primarily to organic disease. Finally, it may cause local pain, referred pain, and headache.

The immediate therapeutic result which follows the eradication of oral sepsis varies and the more conservative often hesitate to promise too much. Frequently the result is excellent. On the other hand, it is often disappointing. It is likely to be disappointing if the removal has been incomplete, or if other coexisting infections have been left intact, also if extreme anatomic changes have been brought about as a result of chronic systemic infection. The best results are obtained in those instances where the systemic effects are chiefly toxic. In these cases a brilliant result often can be secured within a short time.

It is unfortunate that the profession, both in medicine and in dentistry, has not studied the true pathologic conditions in and adjacent to the teeth. The mere suggestion of the report of a single case wherein there was the slightest manifestation of a cure through some form of dental care, started a wave of one or the other forms of treatment throughout the entire country, if not, the dental world. Let me illustrate what I mean. You all remember when some members of the profession who had achieved some reputation as practitioners reported that they were able to cure pyorrhea by the injection of emetine. They went so far as to say that they had obtained cures. This so-called cure for the relief of loose sore teeth became the subject of debate and discussion in our medical and dental journals. Newspapers reported this wonderful miracle. Drug houses, seeing the opening for a good harvest, sent out agents and employees over this entire country, preaching the wonderful cure that could be obtained in the treatment of pyorrhea by adopting emetine as a treatment.

My observation and study of the pathologic conditions involving the teeth and adjacent structures satisfied me that emetine could not bring about the results claimed for it. Today one rarely hears this drug mentioned. It has taken its place side by side with other fads so numerous in the history of medicine. If dental pathology is once mastered, it is only then one can draw certain conclusions in working out a diagnosis. Without a genuine knowledge of the dental tissues, their pathology, and their relation to systemic diseases, both physician and dentist are more liable to err in making a diagnosis and differential diagnosis which will often cause patients to be mutilated and maltreated.

Unfortunately there seems to be a tendency for some practitioners to urge patients who are suffering from rheumatic pains to have teeth extracted without determining the possibilities of eradicating infection without removing these organs of mastication. Such advice is contrary to the laws that govern scientific

diagnosis. Especially is this true of rheumatism, for Dr. Cabot says, "Rheumatism has sometimes turned out, in my experience, to mean aortic aneurysm, cancer of the pleura, tabes dorsalis, osteomyelitis, bone tuberculosis, syphilitic periostitis, lead poisoning, morphine habit, alcoholic neuritis, and gonorrheal infection. Rheumatism is one of the most doubtful of all diagnoses."

These words should prove that all modern aids to diagnosis should be used if one is to safely rely upon his diagnosis.

During the last five years we have tabulated 1,000 cases suffering from miscellaneous systemic complaints, and find that 18 per cent were benefited by the complete eradication of all chronic infections involving the teeth and adjacent structures. Eighty-two per cent were not benefited and it is up to the diagnostician to find out what the contributary factors were that brought on the systemic conditions. Yet, after all, I am satisfied that these 82 per cent who had the oral sepsis removed were benefited in having a clean mouth, and were not liable to suffer from any complications which may arise therefrom.

Time does not permit me to take up this work as I would like to, for volumes have been written and rewritten on this subject covering the subject from the standpoint of etiology, diagnosis, treatment, and prognosis.

There seems to be a diversified opinion among men as to how teeth should be removed. Some practitioners advocate the complete removal of all teeth that are pulpless.

Talbot, in his research on bone absorption around the roots of teeth, reports that dental x-ray pictures do not show the pathology necessary for the guidance in the treatment of interstitial gingivitis, pyorrhea alveolaris, or apical alveolar changes. He finds that there are a number of stages in pathologic evolution from the normal healthy tissue to the fully formed abscess, in which the x-ray does not, and can not, by the present method, discriminate.

To treat diseased teeth successfully, and the alveolar tissues, we must in some way be able to distinguish the finer changes which occur in the evolution of a fully developed abscess. Each stage requires different treatment, and the knowledge of each stage is necessary in deciding whether a tooth can be saved or should be removed.

Talbot further claims that x-ray pictures, as produced today, are far from what they should be. He recognizes the removal of pulpless teeth when all other sources of infection have been executed. He has arrested arthritis deformities, cured headaches, indigestion, boils, skin eruptions, and large glands of the neck by removing pulpless teeth. They did not show defects in the x-ray. I am getting to be more and more inclined to agree with Talbot, and yet we have, in our experience, found that in pulpless teeth, especially single-rooted ones, when treated, and the canal correctly filled, the results were as good as when we would have extracted the teeth. To rely on the x-ray as a guidance in determining whether teeth should, or should not be extracted is problematic. We believe that unless one can grasp the full significance of dental pathology, and be able to differentiate between the various pathologic phases that take place in and about the teeth, one is at sea, and is more liable to err in working out a diagnosis.

The great trouble with the dental profession is that the teaching of pathology

in our dental schools has to be modernized. Unfortunately we find that a large number of dental schools devote too much time to preserving the visible portion of the teeth, and in making restorations which look well and serve well for the purpose of mastication.

Fillings, crowns and bridges have not been, and still are not at the present, constructed with a paramount purpose of avoiding sepsis, and have often been attached to teeth so badly infected that the patient was worse off after dental care. This condition still seems to prevail in a large number of our dental schools. If dentists are to be turned out in the future as they have been in the past, I sometimes shudder when I think of the great suffering there will be caused. I mention this for the reason that I have always hoped that the dental profession would take upon itself to better the standard of dental training. So far little progress has been made. The medical profession may yet find it necessary to incorporate the teachings of scientific dentistry, or, I might better say, stomatology, in its curriculum.

Dentistry in the past has been directed towards the preservation of the teeth for the purpose of mechanical restoration and cosmetic effect, and must in the future be destined for the cure and prevention of disease, combined with cosmetic and functional purposes. In order to impress upon you the result obtained by removal of septic conditions as found in the mouth, I wish to report the findings of a few of our cases:

Mr. C. J. B., age thirty-six years; occupation, salesman; weight 150 pounds, normal weight 220 pounds; complaint, rheumatism. Two years ago he began to suffer from rheumatic pains, and was in bed for six weeks. He was treated by his local physician, and relief came after two months. He had lost 70 pounds in weight. There was a recurrence of his trouble about six weeks before he came to us. He was unable to walk without the aid of crutches, and he found it very difficult and painful. His physician could not find any contributary factor, and, therefore, advised that his teeth be examined. Examination of his mouth showed that he had a well-formed jaw, a full set of teeth, no gingivitis or pericementitis. There was a gold shell crown on each upper lateral. These crowns had been put on for cosmetic purposes when he was a young man. The crowns extended considerably under the gingiva. By palpation over the gum margin, a cheesy-like thick secretion would ooze. The x-ray examination of his teeth showed nothing abnormal. The crowns were removed, and with the aid of the high-frequency we tested the teeth for vital pulps. All responded except the two upper laterals. We diagnosed the two laterals to have dead pulps. The canals were opened up and found to be markedly putrescent. The operation had thus far tired him to the extent that he was unwilling to have anything further done. We recommended the extraction of the two lateral teeth, and he was referred to the hospital so that better care could be given him. This was done. About 24 hours after the two teeth were removed he developed a marked reaction. His temperature went up, and the pains in his joints were excruciating. He was put under the care of a local internist, and by keeping him in bed and giving the usual care his pains began to subside the third day. The fourth day his temperature was normal. He left the hospital after being there ten days, and

could walk without the aid of crutches. He has since gained in weight, and has had no recurrence of his so-called rheumatism. This interesting case supports Talbot's contention. The x-ray was of very little help in determining the cause of his trouble. Knowing that gold crowns endanger the vitality of the pulps, and usually bring on pericementitis, we promptly removed them, and then made the further tests.

Mrs. Anna C., age forty-four years; occupation nurse; 30 pounds underweight; complaint, severe headaches and stomach trouble. This condition had prevailed for three years. The appendix and tonsils had been removed, as it was thought that they might be the cause of her trouble. Heart, lungs and kidneys were normal. Patient very nervous. During the last six months she had been taking osteopathic treatments, which she claimed gave some relief to her head. In examining her mouth we found that it was unclean—the mucous membrane congested, and a marked deposition of tartar. There was an ill-fitting upper right bridge, each holding poorly fitted gold shell crowns. The diagnosis was septic teeth plus a suppurative gingivitis. The tartar from her teeth was carefully scaled, the gum margins treated, swabbing with Dakin solution, the teeth brushed and polished, the bridge removed, dead teeth extracted, and the sockets carefully curetted. We saw her nine times. The pains in her head had disappeared, and her stomach disturbances had been considerably improved. She was advised to report at the office if she should have any further trouble. So far we have not heard from her.

Edward J. M., age thirty-five years; occupation, motorman; weight 150 pounds; complaint, general nervousness. At times he feared driving the car. This would be so grave that he was ready to give up his work. He had pains in his body at times, especially in his back, and he found it difficult to arise after bending. There was a dull aching pain around his teeth continually, severe headaches, and for a time he had pain in the left wrist. He was referred for dental care by the company's physician. Examination of his mouth as to cleanliness was poor. The mucous membrane had a dull purple-like color—would bleed whenever he would bite into anything, like an apple or a crust of bread. Upon palpation over the gum margin considerable pus would ooze out, and with a fine explorer we found deep pockets lying under the gum margin. He had extensive bridge work in the upper and lower teeth. There was a marked deposition of tartar on the lingual surfaces of the lower teeth. The teeth were quite loose. An x-ray examination showed that there was considerable bone destruction around the teeth; nothing wrong at the apical ends. A diagnosis showed suppurative pericementitis. We recommended the complete removal of all teeth, cleansing out all the sockets, and then restoring the organs of mastication with artificial dentures. To this the patient consented. The teeth were removed a few days later and after the gums had fully healed, artificial teeth were fitted. He has since regained his health and considerable in weight.

Mr. H. P., age fifty-nine; occupation, farmer; weight 200 pounds; complaint, extreme pain in his right knee. This condition prevailed for the past 9 months with increasing intensity, causing the patient to be unable to walk without the aid of a crutch during the last three weeks. The pain was more severe

during the night while lying down. Physical examination proved nothing abnormal. This was reported by his physician. Upon examination of his teeth we found that the patient was suffering from a marked gingivopericementitis. Upon pressure on gum tissue with the index finger, one could notice a marked discharge of pus. X-ray examination of his teeth showed nothing abnormal. Diagnosis: acute arthritis; contributing factor, suppurative gingivopericementitis. Patient was given curettements, and rigid prophylaxis, and the packets swabbed with Dakin solution. All dental plaques were removed and the teeth polished. At first there was a marked increase of pain in the knee, but this gradually disappeared, and after about ten treatments the patient was free from all pain, and discharged, cured.

Mr. S. W., age thirty-one years; occupation, salesman; weight 148 pounds; complaint, severe headaches radiating down the back of his neck, which was more severe at night. Examination of his teeth showed that his mouth was well taken care of, teeth looked clean and there was no evidence of gingivitis. The x-ray examination found the teeth to be normal except there was a morbid condition at the root end of the upper left central. The root canals were well filled, and held a gold filling at the mesial surfaces. Diagnosis, apical ostitis. The tooth was removed, and upon placing a curette in the socket, I removed a chronic inflammatory mass usually called a granuloma. The wound was swabbed with iodine, and a few days later he reported that the headaches had disappeared.

One of the most interesting cases I ever treated was the mother of a very prominent physician, and I will give you the history of this case as they gave it to me. The patient was sixty-five years of age, a housewife; past history negative; had given birth to four children, all normal. She had always been in good health. In March of 1914 the patient was sick with grippe. She ran a temperature for weeks, and had acute pain in temples and forehead. There seemed to be a great pressure in the palate bone and nose; eyelids were swollen. In April an eye specialist was consulted, and glasses were fitted. In May she consulted him again, when a diagnosis was made of sinus trouble. She was operated on, remained at the hospital one week, and returned home. She stayed in bed for two weeks, loss of appetite, and very restless. In June a further examination of her nose was made, and a large polyp was removed from the right nostril, but her condition was gradually getting worse. By this time she developed a gastritis, a great pain in her right arm. On July 22 she went to a sanitarium, and diagnosis was made of nephritis. She was given the usual care. In September she was very miserable. Her complexion was a greenish yellow; she lost weight, and still complained of the pressure in her head, and in the region of the palate bone, and extreme nervousness. During the month of October she was confined to her bed and given opiates to give relief. She then was referred to me for examination of her mouth. She wore an upper poorly fitting rubber denture. The lower posterior teeth were missing. The six anterior teeth were slightly loose with marked pockets following the long axes of the roots. Considerable tartar was found attached to the teeth, and lying under the gum margin. The upper gum tissue was very spongy and flabby. Diagnosis: suppurative osteopericementitis, complicated by an abnormal occlusion and faulty

articulation. The teeth were removed. The diseased area was thoroughly curetted and given the usual care. The patient was advised to discontinue wearing the upper plate. Up to this time the patient had lost 33 pounds in weight. After she was given dental care she was sent home a few days later, and a week following I received a letter from her telling that her condition was beginning to improve. One month after the operation I received another letter in which she wrote that she was well and was ready to have artificial teeth constructed. This was done six weeks later, and the patient has fully regained her health.

I could go on and on citing many, many cases wherein the abnormalities of the mouth were the contributing factors that brought on systemic disturbances. Time prevents me from doing so.

In the examination of the mouth in order to determine whether there are any contributing causes that might bring on complaint, it is well to observe the following:

1. Careful inspection of the teeth, the number missing, the number of dead teeth, the occlusion, and the forces of mastication.

2. Inspection of the mucous membrane of the entire oral cavity. In mechanical construction of artificial teeth, such as crowns, bridges, and fillings; the contour of the fillings, ascertaining whether there are any overhanging margins which will permit the accumulation of particles of food and other foreign substances.

3. Exploring the attachment of the soft tissue at the gingiva to ascertain whether there are any pockets; the tartar that may be found around the teeth, and upon palpation whether there is any pus oozing from the gum margin.

4. The testing of the teeth with electrical current to ascertain the vitality of pulps.

5. A complete x-ray examination of the teeth.

These five simple rules should be of great help to diagnosticians to help them work out a better and more complete diagnosis.

ABSTRACT OF CURRENT LITERATURE

Covering Such Subjects as

ORTHODONTIA — ORAL SURGERY — SURGICAL ORTHODONTIA — DENTAL RADIOGRAPHY

It is the purpose of this JOURNAL to review so far as possible the most important literature as it appears in English and Foreign periodicals and to present it in abstract form. Authors are requested to send abstracts or reprints of their papers to the publishers.

Pathologic Conditions Caused by the Impaction of Teeth. Ch. A. Barnhill. Indianapolis Medical Journal, 1920, xxiii, No. 1, p. 6.

Unerupted or impacted teeth are recognized etiologic factors of pathologic conditions such as headache, neuralgia, nerve disturbance, earache, ocular disorders, sometimes primary dementia, and epilepsy, besides neoplasms affecting either the upper or lower jaw. The teeth most frequently impacted are the lower third molars, the next are the upper cuspids, followed by the upper third molars and then the lower cuspids. The pressure of the third molar in its efforts to erupt, against the second molar will cause resorption of the parts of the latter tooth. The resorption may become so extensive that the nerve or pulp of the tooth is encroached upon and a direct irritation is set up, as in a case in the author's experience. Pressure upon the inferior dental nerve from the impacted lower third molar may result in a serious condition. The root development of these teeth may cause infringement of the root upon the inferior dental canal. When this condition is present, the pain is quite likely to be manifested in some other portion of the head as well as in the region of the offending tooth. The impacted lower third molar is probably the source of more conditions of referred or reflected pain than any other organ of the head or jaw. If a wisdom tooth has not erupted at the age of twenty years, it should be located with the aid of the x-ray and in all pathologic conditions a careful radiographic examination should be made for the purpose of locating any impacted teeth. The most common and perhaps the most prevalent disturbances encountered in conditions of impaction are local infections of the soft tissues surrounding the teeth, particularly in the case of the impacted lower third molar.

Treatment ot Cancer of the Tongue by the Bloody Method. Sebileau. XXVIII Congres francais de Chirurgie, Paris, October 6-11, 1919.

Lingual cancer should be extirpated as soon as it appears. The gravity of neglected cancer and the failure of delayed intervention are due to histologic, as well as anatomic, reasons. In consequence of the excellent lymph supply of the tongue, cancer is propagated with such rapidity that some observers do not admit a strictly local affection. Anatomically the tongue, on account of its close

muscular and mucomembranous connections, is often not alone involved, and the numerous forms of mixed cancers, encroaching upon the neighboring regions, require such radical removal in a deep and vital region as to render the prognosis highly unfavorable. Surgical extirpation is the only practical procedure available, but the operability of lingual cancer has its limits, and the author admits the following contraindications: (1) extension to the glossoepiglottic fold and the epiglottis; (2) invasion of the two pillars of the fauces and of the lingual tonsil; (3) deep infiltration of the maxilla; (4) invasion of both halves of the tongue beyond the horizontal line; (5) indefinitely outlined inflammatory glandular congestion. For the radical removal of the cancer, the author rejects total amputation as well as total hemiresection as far as the deep attachments of the tongue. No matter how rapidly the cancer spreads from in front backwards, the results show the benefit obtained from a graded though liberal amputation, which can often be accomplished by the natural passages after extending the labial commissure. Even in the presence of diseased submaxillary and carotid glands, all cancers anatomically capable of being removed through the mouth should be extirpated by this route, which can be widened if necessary. The operation should be performed in a single session, provided the patient's condition permits, beginning with the extirpation of the glands. When the operation has to be performed in two sessions, it should be started with the tongue. Amputation by the mouth, aside from the dangers of delayed hemorrhage, is a fairly harmless operation. Resection of the mandibular margin is more serious, while the transparietal and transmaxillary routes are even more so, all being inevitably accompanied by suppuration and exposing to the risk of secondary infections. The most frequent cause of death is sepsis. Statistical figures vary greatly and are apt to prove misleading. The following is the average for the three months following the intervention: buccal route, 5 per cent deaths; transparietal route, 30 per cent; transmandibular route, 40 per cent. The first is a maximum, the last two are a minimum estimate, the only conclusion to be drawn being the very evident harmlessness of operations through the natural passages and the gravity of the others, in spite of all postoperative precautions. Survivals beyond three years are estimated at 40 per cent in cancers operated upon at an early stage. Survivals in long-standing cancers or in those operated upon through the parietal and mandibular routes are much rarer, but favorable cases are occasionally met with.

The Treatment of Antral Suppuration. S. Hastings. The Lancet, London, 1919, ii, p. 960.

Before promising that the antral operation will completely cure the condition, the operator must have ascertained that there is no disease of the frontal sinuses, ethmoidal cells, or superior maxilla. Where other sinuses are also involved, the infection of the antrum is moreover usually most severe, owing to its imperfect drainage and its large size. At any rate, the pus contained in it will be much more commonly fetid and the bacterial flora more varied. Operation on an infected antrum at the same time when the anterior ethmoidal cells are cleared out, accordingly exposes the ethmoidal region to contact with a very infective pus, with the result that acute inflammation of this region and meningitis are liable to supervene.

The nasal operation is recommended by the author, on the basis of personal favorable experience with it. Under no circumstances should a permanent opening for drainage be made into the mouth, meaning the establishment of a permanent drain from the antrum to an infected cavity like the mouth, as is done after the alveolar operation. On the other hand, after the nasal operation, the antrum is drained into a relatively aseptic cavity. It is probable that the posterior regions of the nose are free from organisms in at least eighty per cent of ordinary healthy people, and even where persisting nasal disease is the cause of the antral trouble, the bacterial inhabitants of the two cavities will be very similar. The nasal operation, in which the whole of the antro-nasal wall is removed without first opening the antrum through the mouth, is almost invariably performed by the author, who has never known it to fail. He has occasionally performed it under local (cocaine) anesthesia, but a general anesthetic, very lightly given, so that the cough reflex is present during the whole operation, is much more convenient. The after-treatment is very simple, syringing can usually be interrupted at the end of three months, to be resumed until the discharge has ceased and the patient is cured.

The Dental Surgeons. Sir Cuthbert Wallace. British Medical Association Proceedings, London, 1919, p. 33.

In describing the rise of the casualty clearing station, the author emphasizes the part played by the dental surgeon. Not only did the dental surgeons do urgent dentistry, but they did an endless number of fillings and conservative work, and supplied thousands of dentures. Every one of them has been more than fully occupied. In order to minister better to the troops, they used to leave the casualty clearing stations on certain days and travel round the ambulances, so that men in the front line could come back and have their teeth attended to without being detained in the hospitals. There have also been various mobile dental units. The Canadians had a very perfect dental organization. Their dental surgeons were attached to the ambulances, and did an immense amount of work in the forward area, even to the provision of gold plates. The part played by the dental surgeons became more and more important as the war went on, and their help in healing the wounds of face and jaw has been of the utmost value. Many wounded men who now lead a comfortable life owe their recovery to the skill of the dental surgeon.

Outside his own professional work, the dental surgeon in many casualty clearing stations performed a very necessary but uninteresting piece of work. He was the entraining officer who handed over the patients to the medical officer in charge of the train. This was a job that often required a good deal of tact, judgment, and charm of manner.

When the war ended, there were 106 dental surgeons with British units.

Pyorrhea Alveolaris. W. Stuart James. The Medical Journal of South Africa, 1919, xiv, No. 10, p. 455.

The inflammatory condition of the gums accompanied by the discharge of pus, known as pyorrhea alveolaris, is attributed to many causes, notably to the entameba buccalis, and to deposits of foreign matter on and around the teeth, in

the form of tartar or calculus, either salivary or serumal. Of the other theories, one is that the saliva holds calcium phosphate and carbonate in very unstable suspension, and in the presence of air, carbonic acid gas is liberated and the calcium salts precipitated. Recession of the gums is not necessarily a feature of the pathology of pyorrhea, but may be due to faulty circulation and insufficient nourishment. Pyorrhea abscesses are located near the cervical border, a favorite place being between the roots of the molars, just under the crown. Protrusion and separation of the upper teeth are often present, due to the inroads of pyorrhea loosening the supporting membrane on the lingual, and undertension on the labial. Failing other signs, x-ray examination is a most useful diagnostic adjuvant, showing not only the disease itself, but the extent to which the alveolar process has been affected, and also any abscess or pus pockets. It will also be a sure guide as to what extractions are necessary by exposing perforations, filled root canals with protruding gutta percha points, root absorptions, etc., all of which make it practically impossible to restore them to normal, and may serve as a sufficient source of infection to seriously injure the chances of curing the others. The duration of pyorrhea is very uncertain, depending on the length of infection. It is certain, however, that it never gets better without treatment, but will continue to get worse until the teeth are exfoliated.

The Vital Staining of Teeth. T. Takamori. Kyoto Journal of Medical Science, 1918-1919, xv, No. 5. (Japanese.)

Under employment of carmine, the dentine in the author's experience is stained in its inner zone, the width of this area varying with the tooth and with the position of the section. The cement is seen to be stained in the vicinity of the dental periosteum and beside the Haversian canals. These findings are in conformity with those noted in bone. The pulp and the peridental membrane are found to contain numerous phagocytes or histocytes which have taken up the carmine granules, and the same stained corpuscles are also encountered lying along the blood vessels.

Dental Caries in Relation to Oral Osmosis. Raguar Eckermann. Monograph, London, 1919. (Printed in Sweden.)

The fact that osmosis can take place through the teeth under certain conditions has been fully established by the authors, in conformity with other investigations. Moreover, under commonly occurring conditions, osmosis actually does and must take place through the teeth; with the inevitable result that plasm from the blood vessels of the pulp is forced up to the osmotic entrance on the tooth, contributing to the formation of the carious area, quite independently of whether or not the protective membrane which has formed is permeable to the salts of the saliva and of the blood. (As a result of transformation, the carious dentine develops very peculiar properties, this transformation tending to form a semipermeable membrane which hinders foreign toxic substances from entering the body.) Enormous quantities of osmotically active substances are introduced into the human mouth, and such substances give the saliva a considerable osmotic strength. When directed against the teeth, this power forces the plasm

of the pulp to the saliva. A clearly visible canal exists between the carious area and the pulp, containing blood plasm, which offers a very favorable culture medium to the microorganisms in the carious matter. The microorganisms of caries can not exist solely upon the dentine and the enamel, but will successively break down the dental tissue. The caries canal represents a physiologico-pathologic connection between caries and the pulp, containing iron and blood.

According to the osmotic theory as explanation of the initial origin of caries, it follows that natural caries can not be the result of pure objective factors, but is the result of reciprocal action between the living element of the tooth and certain agents soluble in saliva and able to develop osmotic superpressure to the blood of the pulp. These objective factors are: (1) sodium chloride; (2) sugar of different kinds; (3) medical salts; (4) different chemical preparations, used as spices, condiments, etc. Sodium chloride may, in over consumption, be regarded as a physiologic poison to the human mouth. Powerful mastication and abundant consumption of common water, a sparing consumption of salt, sugar, chemical preparations, aerated drinks, and avoidance of too hot liquids and food are the leading principles of prophylaxis of dental caries according to the osmotic theory. As the osmotic pressure grows swiftly with rising temperature, all hot liquids containing harmful preparations are comparatively many times more dangerous than cold beverages. A moderate temperature of food and drink is therefore advisable, especially for children. To a cup of tea or coffee holding about 100 c.c., not more than one piece of sugar (6 gm.) must be added.

It is only during the last fifty years that the consumption of strong osmotic agents, sugar, and certain medical preparations, has extensively increased; this consumption of harmful materials corresponding with the increased spread of dental decay. Sugar and chemical substances are known empirically as agents in the development of caries; these substances produce, when dissolved, the physical process called osmosis. It has been shown experimentally that the teeth are sensitive to osmotic influence, in other words, they permit osmosis under certain conditions. The claim of osmosis as the secret driving factor in the genesis of caries rests upon a logically and empirically stable basis. Caries of the teeth (not artificial caries or gingival erosions) is to be regarded as a plasmolysis of the tooth.

Papillomata of the Buccal Mucosa. Levy-Bing and Gerbay. Annales des Maladies Veneriennes, 1919, No. 10, p. 608.

The authors were enabled to observe a case of papillomata of the buccal mucosa in a young Arab twenty-two years of age, who was under treatment for a syphilitic chancre of the prepuce. This chancre was typical, and the Wassermann reaction was entirely positive; secondary manifestations were absent. Examination of the mouth, however, revealed the presence of small tumors having an appearance very similar to ordinary genital proliferations. The mucosa of the internal aspect of the right cheek, at the level of the teeth, presented a collection of small eminences, some hemispherical and sessile, others more voluminous and pedunculated, with a puckered crest. At the periphery of this chief collection,

which was three centimeters long by eight millimeters wide, there were a few isolated lesions the size of a small pinhead, barely protruding above the surface. The coloration of the mucosa at the level of these papillomata was normal, perhaps slightly paler than the surrounding tissues. To the touch, the growths felt like solid but flexible granules, as if the fingers were in contact with genital proliferations. These excrescences had originated about six months previously. The patient complained of no unpleasant sensation, spontaneous or on contact, but a rather severe pain was sometimes experienced while eating, due to the papillomata being caught between the dental arches, or crushed by certain hard foods, such as bread crusts. The numerous membranes of the left cheek, the palate, the tongue, and the pharynx presented no abnormal protuberance; but on the upper lip were two lesions having the appearance of condylomata, measuring about one millimeter, exactly circular, papular, with a smooth surface and of a yellowish-pink color. Furthermore, two typical condylomata about the size of one millimeter, circular, with a smooth surface and of a yellowish color, were seen at the upper portion of the left upper eyelid. On examination of the genital and anal regions, no proliferations were found. The treatment adopted for the buccal papillomata consisted in scraping with the curette, after local anesthesia with ethyl chloride.

Ocular Disturbances of Buccal Origin. A. Terson. La Clinique Ophthalmologique, 1919, viii, No. 2, p. 81.

It is undoubtedly of advantage to emphasize from time to time the certain, probable or possible dental etiology of numerous affections of the eye and its adnexa, when after a very careful examination no other etiology seems to be admissible. The relations between dental affections and eye diseases were pointed out by the author in 1911, with special reference to those dental and buccopharyngeal conditions which are apt to involve ocular sequelæ. The etiologic connection sometimes is based on certainty (orbital and occasionally ocular affections), or on a great probability. In the presence of an obviously infected mouth, together with ocular disease of unknown cause, the dental origin is plain, if not demonstrable. In certain ocular affections of uncertain etiology, for example, in acute unilateral retrobulbar neuritis, this dental origin is entitled to special inquiry, in the opinion of the author; but in a number of eye diseases developing on the basis of some infection or a general chronic disease, acquired or congenital, an etiology through a neighboring focus such as the mouth, nasopharynx, cavities, and so forth, would seem to be rarely exclusive. The infectious focus determines the ocular lesion merely by acting upon a soil of lessened resistance, and the ocular localization supervenes at the time of a dental caries, angina, or nasal infection. The various etiologies are often superadded, so that it is advisable to admit a preponderating but rarely exclusive oculo-dental etiology. Treatment should therefore never be restricted to the mouth, but in all patients having eye disease of doubtful origin and diseased mouths, all abnormal general conditions, functions, visceral apparatus, and so forth, should be treated as well as the mouth, by polyvalent therapeutic measures, as it were. Oculodental complications, under proper hygiene of the mouth, should soon be numbered among the almost invariably preventable diseases.

Eyes Affected by the Teeth. M. K. Bridges. The Dental Mirror for 1845, p. 18.

[The following note is offered to the readers of the Abstract Department on account of its historical interest and as a proof of the excellent information enjoyed by the dental practitioner of seventy-five years ago.]

We have had within the past three months, a gentleman under treatment whose right eye was almost incessantly affected with pain and tears, from pain originating in the molar teeth on the same side, which were perfectly sound. The first bicuspid, which was slightly decayed, was first removed, without much relief. In the course of three months, two molar teeth were removed. The last gave perfect relief. The origin of the pain was in the antrum, into which the roots of the second molar protruded. The pain and overflowing of water of the eye was from nervous sympathy, not from any direct communication between the teeth and eye.

Pulp Nodules. D. E. Caush. British Dental Journal, 1919, xl, No. 24, p. 885.

The pulp tissue in which these nodules are developed is of vital importance to the life of the tooth, and on account of its varied functions, it is a tissue of special interest to the dentist. It not only supplied the necessary nourishment to the hard tissues by which it is surrounded, but when necessary, seeks to defend itself from both external and internal enemies to the inroads of which it is subjected. This function of defense the pulp accomplishes by producing a hard tissue from its substance, known as secondary dentine, which may be considered as, (a) normal; and (b) pathologic. The latter is the result of irritation to the pulp tissue, and is formed for the purpose of defense against an enemy which may be exterior to the pulp, as in erosion, attrition, abrasion, or the earlier stages of caries. These are also at times enemies to be found within the camp, and as there are no lymphatics in the pulp, its only method of defense is to envelop the enemy found within its borders by surrounding it with hard tissue. This enveloping process results in a pulp nodule, which is usually formed in the pulp to protect it from any foreign or dead substances, which may take the form of dead cells from the tissue, or from red corpuscles liberated from the capillaries, either by rupture of the latter, or by their walls allowing the corpuscles to pass through as a result of disease, or from any disease that may produce dead tissue in small quantities of the pulp. The position of the secondary dentin is controlled by the position of the foreign matter in the pulp; the nodules are to be found from near the radical apex of the pulp chamber to the opposite end where the pulp is contiguous with the dentine. In size and shape the nodules vary from microscopic points to large, irregular masses; in extreme cases almost filling the whole of the pulp chamber. There is little or no discomfort produced in those cases where the pulp nodules do not press upon or involve the nerves in the pulp; but when their development occurs near any of the nerves, and as a result of their growth, pressure is produced upon the nerves, pain is felt, the amount of which is controlled by the amount of pressure produced. The most acute pain may be set up by the formation of nodules in the restricted area of the pulp, near the point where it enters the dentine.

When sections of the nodules are examined by the aid of the microscope, they are seen to vary considerably in structure, from dense, almost structureless tissues, sometimes laminated with few markings, to those containing many markings and at times irregular spaces, caused by portions of the tissue not having been calcified during the development of the nodule.

The Care of the Teeth in Relation to Motherhood and Infancy. C. P. Blay. British Dental Journal, 1919, xl, No. 24, p. 887.

In the formation of the teeth, two things are of great importance; first, the provision of correct nourishment, and second, the absence of any poisons in the blood. The teeth germs are first to be found in the fetus about seven weeks after conception, and calcification, or the deposit of lime and other salts, commences at sixteen weeks, when the germs of the permanent teeth may first be found. Unless the maternal blood contains all the proper salts and vitamines, the teeth of the child are likely to develop soft, that is, much less able to resist the attacks of acids or germs. Development is also seriously interfered with by the presence of any poisons, such as mercury, toxins from any acute or chronic infection, and parasites, such as syphilis. In the diet of a pregnant woman, the presence of sufficient vitamines and bone salts is of the greatest importance. Given good feeding, enough exercise, and plenty of fresh air, besides proper care of the mouth, there is no reason at all why the teeth of a pregnant woman should be affected; but where there is food shortage, the tissues of the mother always tend to suffer rather than those of her unborn child. The vitamines mentioned above are found chiefly in fresh and natural foods, and especially in the outer skin and husks of vegetable foods; for instance, unpolished rice, oatmeal, and whole meal flour contain many more vitamines than polished rice and white flour. After a child is weaned, hard food should be started as soon as the teeth are able to chew. The constant administration of mercurial powders to infants not only leads to stomatitis, but also seriously damages the enamel of the growing teeth. The best drug for use locally in mercurial stomatitis in infants and adults is chlorate of potash as a tooth powder or mouth wash. Common salt makes a very cleansing powder for the teeth, but if this is not sufficient to remove slime, soap and whitening is cheap and efficient. The last food taken at a meal should be of a detergent nature, such as raw fruit.

Industrial Medical and Dental Clinics in the Women's Garment Trades. G. M. Price. Modern Medicine, 1919, i, p. 47 (New Series).

A medical clinic was established in 1912, by the Joint Board of Sanitary Control, in the women's garment trades of New York City, and since its establishment has made more than twenty-seven thousand examinations. An important extension of the activities of this clinic is the dental clinic, a unique establishment in the fact that it is probably the first industrial cooperative, self-payng, dental clinic established, conducted, and managed by the workers themselves. The twenty-seven thousand examinations made in the medical clinic have clearly shown that a great many of the workers are suffering from defective teeth, and have likewise shown that a large number of these defects were directly contributory to various diseased conditions among these workers. Furthermore, it has been

shown that the ordinary dental work which has been perpetrated upon the poor workers on the east side in New York City not only does them no good but does them real harm. Many of their dental defects are simply hidden and obscured by the gold crowns and bridges which are so lucrative to the dentist and so harmful to the patients.

The dental clinic is established to do thoroughly honest work in dentistry at a reasonable cost. The clinic employs a competent medical dentist who is doing good work and whose purpose is not so much curative as prophylactic. Educational work in prophylaxis is carried on all the time and is the main purpose of the clinic. All work is done in the clinic, which at present employs two full-time and two part-time dentists. During the year of 1918, the dental clinic treated 7,465 patients, and has had an income of $12,576.73. It has practically paid for itself, although it had a slight deficit of $292. The charges to patients are based upon cost, approximately $2.50 being charged for an hour's work. Both the medical and dental clinics are very popular among the workers, and have proved successful in every respect.

Experimental Evidence Demonstrating the Influence of a Special Dietetic Factor on the Development of the Teeth and Jaws. M. Mellanby. The Dental Record, 1920, xl, No. 2, p. 65.

The author emphasizes the importance of vitamines in the diet, especially of the young. Only very small quantities of vitamine are required, and for this reason these substances must be put in a nutritive category different from that which comprises the better known foodstuffs, such as proteins, carbohydrates, and fats. There is at present no knowledge concerning their chemical nature. Three separate vitamines are known: (1) Antiscorbutic; (2) Water soluble B, or antineuritic; (3) Fat soluble A. They are associated with natural foods and can only be recognized by what they do to the animal body or by what follows when they are specifically absent from the diet. The antiscorbutic factor is that one which, when absent from the diet, gives rise to scurvy. It is found in the largest quantities in fresh foods, especially in fresh vegetables and fruit; the orange and lemon being particularly rich in this respect. Water soluble B is probably identical with the antineuritic, or anti-beri-beri, factor. It has a very wide distribution in nature, and is present in the majority of natural foods examined; it has a great resistance to heat. The vitamine known as fat soluble A and believed to be necessary for growth is not always found associated with fats and is not even always soluble in fat solvents. This factor is present in most animal fats and in green vegetables. It is deficient in linseed, rapeseed, and hydrogenated fats. It appears to be fairly resistant to heat, lying in this respect between the antiscorbutic and antineuritic factors. The most widely distributed of the three factors is water soluble B, and with a mixed diet, there is no danger of a deficiency of this vitamine; neither is there much real danger of a deficiency of the antiscorbutic factor so long as the food eaten has not in its preparation been subjected to prolonged heating.

It is, however, very easy to choose a diet in which fat soluble A is deficient, very little or none being contained in a diet consisting largely of bread, porridge, rice, and other cereals, lean meat, margarine, jam, tea, sugar, etc., all very popu-

lar articles of consumption, especially among the poor. Evidence is adduced by the author, which suggests that the deficiency of this factor in the diet of the young may be responsible for many of the defects of modern teeth and jaws, and possibly indirectly for the prevalence of caries among civilized communities. In other words, however much calcium there may be in the diet, it can not be used by the tissues to the extent necessary for the construction of normal teeth and jaws, unless fat soluble A, or something with a similar distribution, is also present. Demonstration specimens shown by the author, consisting of puppies' jaws, drawings, histologic sections of jaws and teeth, x-ray photographs and lantern slides go to prove that in the case of puppies at any rate, fat soluble A or something with a similar distribution to that substance, is one of the principal factors involved in the normal growth of the jaws and teeth. It appears that the younger the animal, the more essential is fat soluble A, and the more rapid the rate of growth, the greater the quantity needed to keep that growth normal. Whether fat soluble A works directly on the ameloblasts and other calcium depositing cells, or whether it has an indirect effect by stimulating some intermediate tissue, must, for the time being remain simply a case of conjecture. There is, of course, evidence that certain endocrine organs, such as the pituitary, the parathyroid, and the thymus glands, are involved in calcium metabolism, but there is no experimental evidence that fat soluble A has any specific effect on these bodies.

It has been the author's endeavor to furnish evidence that the origin of many dental defects is possibly largely dietetic, and that the factor at fault is very definite in its action. A palatable diet can be arranged with its fat soluble A content so as to produce sound teeth and normal jaws.

The International Journal of Orthodontia and Oral Surgery

PUBLISHED THE FIFTEENTH OF EVERY MONTH BY

THE C. V. MOSBY CO., 801-809 Metropolitan Bldg., St. Louis, Mo.

Foreign Depots—*Great Britain*—Henry Kimpton, 263 High Holborn, London, W. C.; *Australasia*—Stirling & Co., 317 Collins Street, Modern Chambers, Melbourne; *India*—"Practical Medicine," Egerton Street, Delhi; *Porto Rico*—Pedro C. Timothee, Rafael Cordero 68, San Juan, P. R.

Subscription Rates—Single copies, 50 cents. To anywhere in United States, Cuba, Porto Rico, Canal Zone, Mexico, Hawaii and Philippine Islands, $5.00 per year in advance. Under foreign postage, $5.40. Volume begins with January and ends with December of each year.

Remittances—Remittances for subscriptions should be made by check, draft, postoffice or express money order, or registered letter payable to the publishers, The C. V. Mosby Company.

Contributions—The editor will be pleased to consider the publication of original communications of merit on orthodontic and allied subjects, which must be contributed solely to this journal.

Opinions—Neither the editor nor the publisher hold themselves responsible for the opinions of contributors, nor are they responsible for other than editorial statements.

Reprints—Since it is not desirable to hold type standing longer than absolutely necessary, all requests for reprints should be made at time of submitting manuscript for publication. Rate card will be sent with galley proof.

Communications—Contributed articles, illustrations, letters, books for review, and all other matter pertaining to the editorial department should be addressed to the Editor, Doctor Martin Dewey, 25 East Washington Street, Chicago, Ill. All communications in regard to advertising, subscriptions, change of address, etc., should be addressed to the publishers, The C. V. Mosby Company, 801-809 Metropolitan Building, St. Louis, Mo.

Illustrations—Such halftones and zinc etchings as in the judgment of the editor are necessary to illustrate articles will be furnished when photographs or drawings are supplied by the authors of said articles.

Advertisements—Objectionable advertisements will not be accepted for publication in this journal. Forms close first of month preceding date of issue. Advertising rates and sizes on application.

Change of Address—The publishers should be advised of change of subscriber's address about fifteen days before date of issue with both new and old addresses given.

Nonreceipt of Copies—Complaints for nonreceipt of copies or requests for extra numbers must be received on or before the fifteenth of the month of publication; otherwise the supply is apt to be exhausted.

Entered at the Post Office at St. Louis, Mo., as Second-Class Matter.

EDITORIALS

Some Unfairness in Classifying Dental Schools

SINCE the organization of the Dental Educational Council of America and its attempt to classify the dental schools according to the requirements, as outlined at the Louisville meeting July 24th, 1916, and later revised August 3rd, 1918, a great many difficulties have arisen that have subjected the council to criticism. We believe that as a whole the action of the council has been for the benefit of the dental profession and to the advantage of the dental students, but we are also convinced that some schools have been given a much better standing and classification than they are entitled to and a great many schools have been made to appear in a very unsatisfactory light.

The classification of dental schools has been more or less an arbitrary matter, based upon requirements which the Dental Educational Council has selected, and which have not been strictly adhered to in a number of cases. Schools meeting with certain requirements laid down by the Dental Educational Council of America, have been given a Class A rating, while "schools which in certain particulars

do not meet the requirements of the Class A, but may be become eligible for Class A without complete reorganization" have been placed in Class B. The first great unfairness or injustice appears in the establishment or formation of Class B schools. There is no definite reason why a school is a Class B, except that "in certain particulars" they "do not meet the requirements for Class A." As a result of this classification it follows that in a great many instances the difference between a Class A and a Class B school may not be as great as the difference which exists between two Class A schools. In other words, some Class A schools are far superior to other Class A schools. Again, a great many Class A schools may be placed in that rating by a small margin, while the majority of Class B schools fail to get in Class A also by a very small margin. However, the majority of the public and the dental profession are inclined to believe there is a great difference between Class B and Class A schools. This difference does not exist.

We have always contended the greatest factor in the classification of dental schools should be based upon the work which the dental school is doing, and this work should, to a great extent, be judged by the number of students that pass the state board examination and the quality of men that have resulted from the graduates from the particular school.

In considering the classification of dental schools, we believe that a remark made by Dr. T. E. Purcell of the State Board Dental Examiners of Missouri sums up the situation in the most logical manner. We are also convinced of the fact that Dr. Purcell's statement is based on actual contact with graduates from various schools during the time he has been a member of the state board. Dr. Purcell says: "I want to call your attention to the fact that the classification of schools by the board [The Dental Educational Council of America] is an arbitrary classification, absolutely arbitrary. I maintain in the state of Missouri we have dental colleges, we have Class B schools that are superior in every respect to Class A schools that have been classified by this committee. The classification is not standardized. The fact that we have Class B schools is no reflection, because they turn out as good men as there are in the United States."

From the knowledge we have of the various students and the various men in the dental profession, we are convinced that Dr. Purcell's statement is absolutely correct: namely, there are just as good men graduated from Class B schools as ever came from a Class A school. The finished product of the dental school or the graduate as he goes out into the profession should be the greatest factor in considering the ability of dental schools to teach dentistry.

The National Educational Council of America has laid great stress upon the administrative policy of dental schools, and has placed great importance upon the value of the building and equipment, which we have always believed to be only one of the external evidences of the dental school. Such a requirement gives the schools with newly constructed buildings an advantage over those with older buildings; but it does not necessarily mean that the institution with the new building is going to turn out any better dentists than the school with the old building. A classification of dental schools according to Classes A and B forms in the mind of the public the idea that Class A schools are far superior to Class B, when, as a matter of fact, they are not so far superior, and, in some instances, not at all. In fact, we believe a number of schools succeeded in getting into Class A by

a very small margin, while a number of Class B schools were kept in Class B because they were deficient only in a small number of points. However, the public fails to recognize this, but is constantly thinking of the superiority of one school over the other.

We are unable to state how this matter can be rectified. We are not inclined to place all the blame upon the Educational Council. Under the existing conditions it has acted in the most satisfactory manner, but that action has, nevertheless, resulted in great injustice to many Class B schools, and has given others in Class A, a rating which they are not justified in having when judged by results. However, this injustice will probably only be eliminated by Class B schools so arranging their administrative policies and teaching conditions as to meet with the requirements laid down by the Dental Educational Council of America.

The Normal and Pathological Histology of the Mouth*

SOME time ago there came to our desk for review two books by Arthur Hopewell-Smith, dealing with the "Normal and Pathological Histology of the Mouth." These volumes cover the histology of the teeth and supporting structures in such a complete manner that we thought it would be unfair to attempt to review them until we had made a careful study of both volumes, realizing a hasty review might be unfair to the author and also to the profession. After giving these books some study, we are convinced that they are a presentation of the subject in a much better and more complete manner than has ever been given before to the profession. While in some of the disputed points we may not exactly agree with the author, at the present time we are not in a position to absolutely prove that our views regarding development of some of the structures of the teeth are absolutely correct. The great difficulty in studying the development of the teeth and the supporting structures is that after specimens are prepared, cell metabolism has been absolutely stopped, and things may present a different appearance from what they really are. It is also very difficult to get a large number of embryos showing development at various stages, without which the chain of evidence is insufficient to establish the entire development of the study.

The first eight chapters of Volume I deal with the dental tissue. Chapter II is devoted to Nasmyth's Membrane, which has always been more or less of an elusive organ in the hands of a number of investigators. Its origin and function may still be considered to be a disputed point among histologists, probably because it seems to have no particular function, especially in man. So the question still remains as to whether it is a useful part of a tooth or whether it is an evolutionary tissue may have had some function in other types of development and tooth attachment than those found in animals today. Chapter III is devoted to the discussion of Enamel in a very complete manner, and shows a number of photographs which are superior to anything we have seen on this subject.

The dentine is treated in a much broader manner than is usually the case in works on Dental Histology, and the four varieties of dentine as recognized by comparative anatomists are mentioned. Chapter V deals with the Cementum,

**The Normal and Pathological Histology of the Mouth.* By Arthur Hopewell-Smith, L.R.C.P., Lond., M.R.C.S., Eng., L.D.S., Eng., Vol. I, 345 pages, 262 illustrations; Vol. II, 477 pages, 394 illustrations. P. Blakiston's Son & Co., Philadelphia, publishers. Price $4.50 per volume.

and is presented in the usual way by textbooks on dental histology. From studies of the cementum prepared by Dr. F. Hecker a few years ago, which were studied by the reviewer in conjunction with him, we question the origin of the cementum as outlined by Professor Hopewell-Smith, and some of the other dental investigators at the present day. The result of Dr. Hecker's investigation was published a few years ago in The International Journal of Orthodontia and Oral Surgery, and seems to be more in keeping with the physiology and pathology of the structures as found in clinical practice than the origin of the tissues as outlined by the majority of the investigators at the present time.

Three chapters of Part II of the first volume are devoted to the consideration of the oral tissues, which, of course, is very much the same as found in any other textbook on Histology.

Part III of Volume I is given over to the Histogenesis of the Teeth of Mammals, Fishes and Reptiles, which is a subject that is not found in the average book on dental histology, but which has a great bearing upon the development of the teeth and is very important so far as the proper understanding of the subject is concerned.

Volume II of the work is devoted to Pathological Histology and is a valuable addition to dental literature. It is a subject which as a rule has not been given the consideration due it. The second volume is arranged along the same general plan as the first volume, Part I covers the pathological conditions of the dental tissue, taking up the pathology of the enamel, dentine, and cementum. Dental Caries is treated in one chapter, while Disease of the Dental Pulp is taken care of in five chapters and is handled in a very complete manner. Three chapters are devoted to pathological conditions of the Alveolar Dental Periosteum, or the so-called Peridontal Membrane. One chapter is devoted to consideration of "Pyorrhea Alveolaris" with quotation marks.

Part II which covers five chapters is given over to the consideration of the Pathological Conditions of the Oral Tissue. Part III contains one chapter under the title of Extra-Oral Dental Tissues, dealing with dermoid teeth or teeth developed in Teratomata. The second volume, as the first, is illustrated by a large number of microphotographs, which makes the work one of the most complete we have ever reviewed on this subject. Professor Hopewell-Smith's association with the research laboratories at the University of Pennsylvania gives him the opportunity to examine a large amount of material under the most favorable conditions.

We know of no work on the subject that would be a more valuable addition to the library of any one interested in this scientific subject.

A Practical Treatise of Fractures and Dislocations of the Jaws*

"A PRACTICAL Treatise of Fractures and Dislocations of the Jaws" is the title of a monograph prepared by Chalmers J. Lyons, D.D.Sc. The book is arranged for students and practitioners. This work is dedicated to Dr. Cyrenus G. Darling, who has done much for the advancement of oral surgery in the Uni-

**A Practical Treatise of Fractures and Dislocations of the Jaws, for Students and Practitioners.* By Chalmers J. Lyons, D.D.Sc., Professor of Dental Surgery, University of Michigan. Ransom & Randolph Co., Toledo, Ohio, Publishers, 102 pages, 114 illustrations. Price $2.00.

versity of Michigan. The introduction covers the literature of ancient times in relation to the dislocations and the fractures of the jaws. In Chapter I we find the definition and classification of dislocations, including etiology, symptoms, and treatment. Chapters II, III, IV, and V are given over to the consideration of the fractures of the jaws and various types and varieties of fractures, their signs, symptoms, and diagnosis. The use of the x-ray in diagnosis and treatment is also taken up. Chapter X is devoted to the consideration of Gunshot Fractures and the various methods employed by the different men in the treatment in the service. Chapter XI takes up the Treatment of Bone Graft, which gives the history and fundamental principles of treatment, the description of Albee's method, also that of Gallie and Robertson. Chapter XII is devoted to Anesthesia in the Reduction of Fractures, which closes the monograph in a most complete and satisfactory manner. The book contains 102 pages and 114 illustrations.

We know of no other work on the subject which gives a more concise and complete exposition of the subjects than Dr. Lyons' work.

Everyday Mouth Hygiene*

"EVERYDAY MOUTH HYGIENE" is the title of a book written by Joseph Head, M.D., D.D.S., of the Jefferson Hospital, Philadelphia, Pa. The book is exactly what the title indicates. It is devoted to the importance of dental hygiene and gives a description of the manners in which certain infections may occur from oral uncleanliness, and also proper means of cleansing the teeth. A great deal of importance is laid upon the proximal contact of the teeth, and the proper use of the floss silk in such a manner as to avoid injuring the gum, and also be sure of thoroughly cleansing the proximal contact and embrasure surfaces of the teeth. A number of original illustrations are published, showing the proper use of the floss silk, which should be of great benefit to individuals not familiar with this important means of cleansing the teeth. The question of the proper use of the toothbrush is also discussed, with original illustrations showing the use of the brush both in the mouth of the patient and upon a skull. The book also contains a short chapter upon the irregularity of children's teeth in which it emphasizes the importance of early treatment and the correction of irregularity from a prophylactic and hygienic standpoint. The work is one which the laity should be urged to read, and it would be a good book to recommend to all who are interested in mouth hygiene.

**Everyday Mouth Hygiene.* By Joseph Head, M.D., D.D.S., Dentist to the Jefferson Hospital, Philadelphia. W. B. Saunders Co., Philadelphia and London, publishers, 67 pages, 39 illustrations. Price $1.00.

ORTHODONTIC NEWS AND NOTES

The editors desire to make this department a permanent feature of the Journal, but in order to do so must have the full support of the orthodontic profession throughout the country. We would deem it a great favor if our subscribers and readers would send in such announcements as might be of interest to the profession.

Twentieth Annual Meeting of the American Society of Orthodontists

The Twentieth Annual Meeting of the American Society of Orthodontists will be held at the Edgewater Beach Hotel, Chicago, Ill., Monday, Tuesday, and Wednesday, April 5, 6, and 7, 1920. A splendid program, including clinics and case reports, has been arranged by the Board of Censors.

Alumni Society of Dewey School of Orthodontia

The next annual meeting of the Alumni Society of Dewey School of Orthodontia will be held April 1, 2, and 3, 1920, at the Edgewater Beach Hotel in Chicago. All interested in orthodontia are cordially invited to attend these meetings. Address all communications to the Secretary, Dr. George F. Burke, at 741-43 David Whitney Building, Detroit, Mich.

American Institute of Dental Teachers

At the annual meeting of the American Institute of Dental Teachers, held in Detroit in January, the following officers were elected: *President,* Dr. Arthur D. Black, Chicago, Ill.; *Vice-President,* Dr. Guy S. Millberry, San Francisco, Cal.; *Secretary-Treasurer,* Dr. Abram Hoffman, Buffalo, N.Y.; *Executive Board,* Dr. A. H. Hipple, Omaha, Nebr., Dr. A. E. Webster, Toronto, Ont., Dr. E. D. Collidge, Chicago, Ill.

Abram Hoffman, Secretary,
381 Linwood Ave., Buffalo, N. Y.

Notes of Interest

Dr. H. D. Broadbent announces the opening of his office in the Schofield Building, Cleveland, Ohio, for the practice of orthodontia.

Dr. Leslie M. Christie announces the opening of his office at 710 Fourteenth Street, Washington, D. C., for the exclusive practice of orthodontia.

Dr. Martin Dewey, of 25 East Washington St., Chicago, Ill., desires to announce the opening of his eastern office in New York City at 501 Fifth Ave., for the exclusive practice of orthodontia.